CCNA Chapter 1-11

CCNA Final Exam

CISCO IT 257

CCNA 2 Chapter 1 v5.0 Exam Answers 2013

1

What is one advantage of using the cut-through switching method instead of the store-and-forward switching method?

has a positive impact on bandwidth by dropping most of the invalid frames

makes a fast forwarding decision based on the source MAC address of the frame

has a lower latency appropriate for high-performance computing applications*

provides the flexibility to support any mix of Ethernet speeds

2

A network designer must provide a rationale to a customer for a design which will move an enterprise from a flat network topology to a hierarchical network topology. Which two features of the hierarchical design make it the better choice? (Choose two.)

reduced cost for equipment and user training

less required equipment to provide the same performance levels

simpler deployment for additional switch equipment*

easier to provide redundant links to ensure higher availability*

lower bandwidth requirements

3

What are two advantages of modular switches over fixed-configuration switches? (Choose two.)

availability of multiple ports for bandwidth aggregation

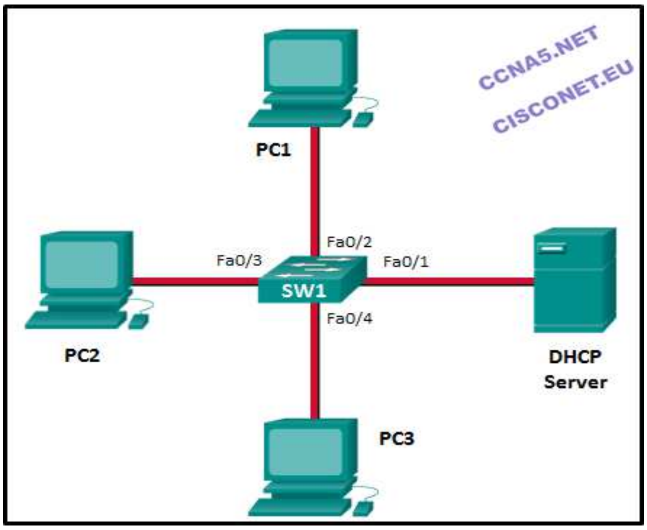
lower forwarding rates

need for fewer power outlets*

lower cost per switch

increased scalability*

4



Refer to the exhibit. Consider that the main power has just been restored. PC1 asks the DHCP server for IPv4 addressing. The DHCP server sends it an IPv4 address. While PC2 is still booting up, PC3 issues a broadcast IPv4 DHCP request. To which port will SW1 forward this request?

to Fa0/1, Fa0/2, and Fa0/4 only

to Fa0/1, Fa0/2, Fa0/3, and Fa0/4

to Fa0/1 and Fa0/2 only

to Fa0/1, Fa0/2, and Fa0/3 only*

to Fa0/1 only

5

What is one function of a Layer 2 switch?

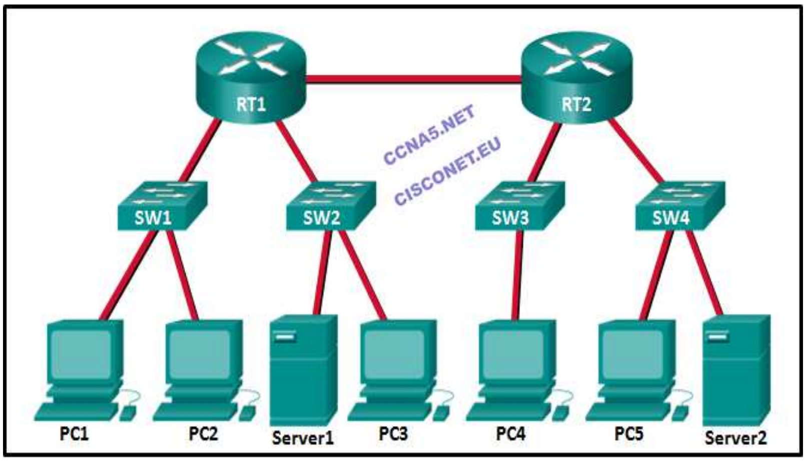
forwards data based on logical addressing

learns the port assigned to a host by examining the destination MAC address

duplicates the electrical signal of each frame to every port

determines which interface is used to forward a frame based on the destination MAC address*

6



Refer to the exhibit. Fill in the blank.

There are ” **12** ” collision domains in the topology.

7

What is a collapsed core in a network design?

a combination of the functionality of the access, distribution, and core layers

a combination of the functionality of the access and core layers

a combination of the functionality of the distribution and core layers*

a combination of the functionality of the access and distribution layers

8

What are two reasons a network administrator would segment a network with a Layer 2 switch? (Choose two.)

to enhance user bandwidth*

to eliminate virtual circuits

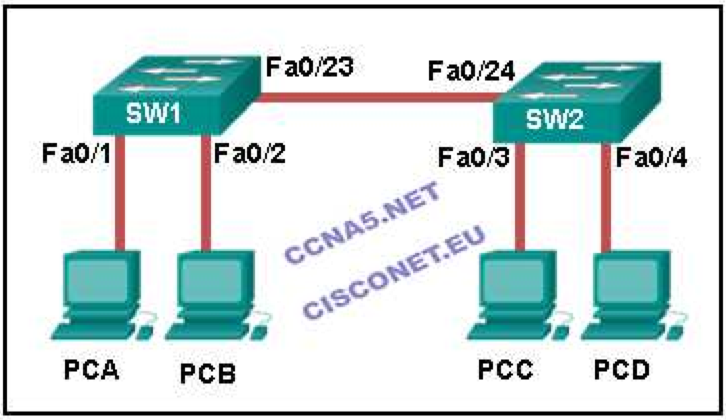
to create more broadcast domains

to isolate traffic between segments*

to isolate ARP request messages from the rest of the network

to create fewer collision domains

9



Refer to the exhibit.

How is a frame sent from PCA forwarded to PCC if the MAC address table on switch SW1 is empty?

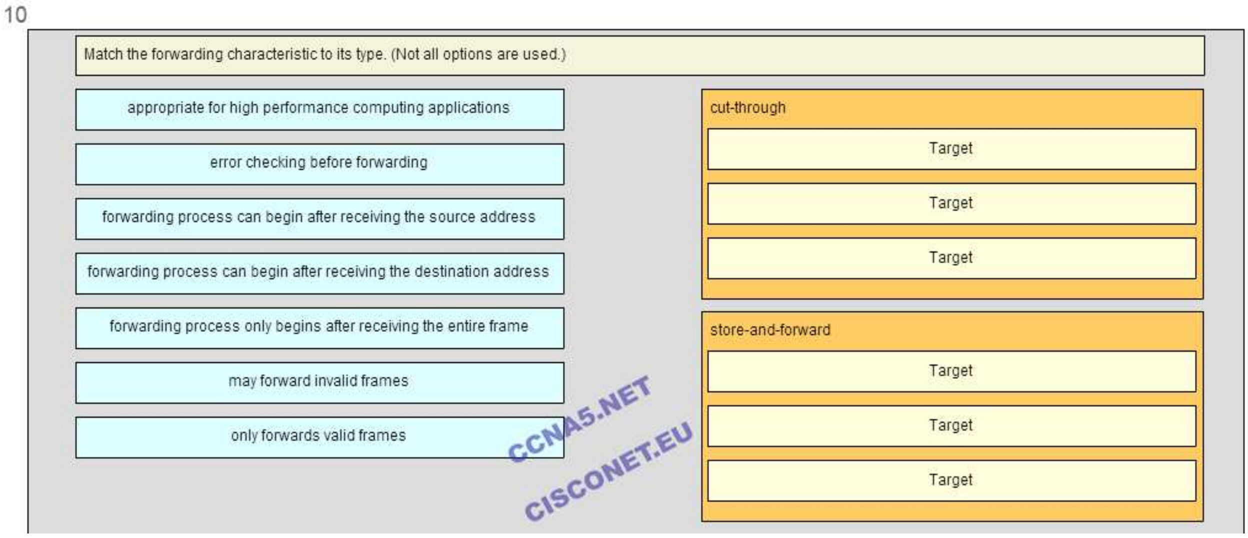
SW1 forwards the frame directly to SW2. SW2 floods the frame to all ports connected to SW2, excluding the port through which the frame entered the switch.

SW1 floods the frame on all ports on the switch, excluding the interconnected port to switch SW2 and the port through which the frame entered the switch.

SW1 floods the frame on all ports on SW1, excluding the port through which the frame entered the switch.*

SW1 drops the frame because it does not know the destination MAC address.

10


10

Match the forwarding characteristic to its type. (Not all options are used.)

appropriate for high performance computing applications
error checking before forwarding
forwarding process can begin after receiving the source address
forwarding process can begin after receiving the destination address
forwarding process only begins after receiving the entire frame
may forward invalid frames
only forwards valid frames

cut-through
Target
Target
Target

store-and-forward
Target
Target
Target

Place the options in the following order:

[+] appropriate for high performance computing applications

[+] forwarding process can begin after receiving the destination address

[+] may forward invalid frames

[#] error checking before forwarding

[#] forwarding process only begin after receiving the entire frame

[#] only forward valid frames

[+] Order does not matter within this group.

[#] Order does not matter within this group.

11

What is a basic function of the Cisco Borderless Architecture distribution layer?

aggregating Layer 3 routing boundaries*

aggregating all the campus blocks

acting as a backbone

providing access to the user

12

ABC, Inc. has about fifty hosts in one LAN. The administrator would like to increase the throughput of that LAN. Which device will increase the number of collision domains and thereby increase the throughput of the LAN?

hub

host

NIC

switch*

13

What does the term "port density" represent for an Ethernet switch?

the numbers of hosts that are connected to each switch port
the speed of each port
the memory space that is allocated to each switch port
the number of available ports*

14

Which type of transmission does a switch use when the destination MAC address is not contained in the MAC address table?

anycast

unicast

broadcast*

multicast

15

What is a basic function of the Cisco Borderless Architecture access layer?

aggregates Layer 3 routing boundaries

provides high availability

aggregates Layer 2 broadcast domains

provides access to the user*

16

What information is added to the switch table from incoming frames?

source MAC address and incoming port number*

destination MAC address and incoming port number

destination IP address and incoming port number

source IP address and incoming port number

17

Fill in the blank.

A “**converged**” network is one that uses the same infrastructure to carry voice, data, and video signals.

18

An administrator purchases new Cisco switches that have a feature called StackPower. What is the purpose of this feature?

It enables many switches to be connected with a special fiber-optic power cable to provide higher bandwidth.

It enables the sharing of power among multiple stackable switches.*

It enables many switches to be connected to increase port density.

It enables many switches to be physically stacked in an equipment rack.

It enables AC power for a switch to be provided from a powered patch panel.

19

Which switch form factor should be used when large port density, fault tolerance, and low price are important factors?

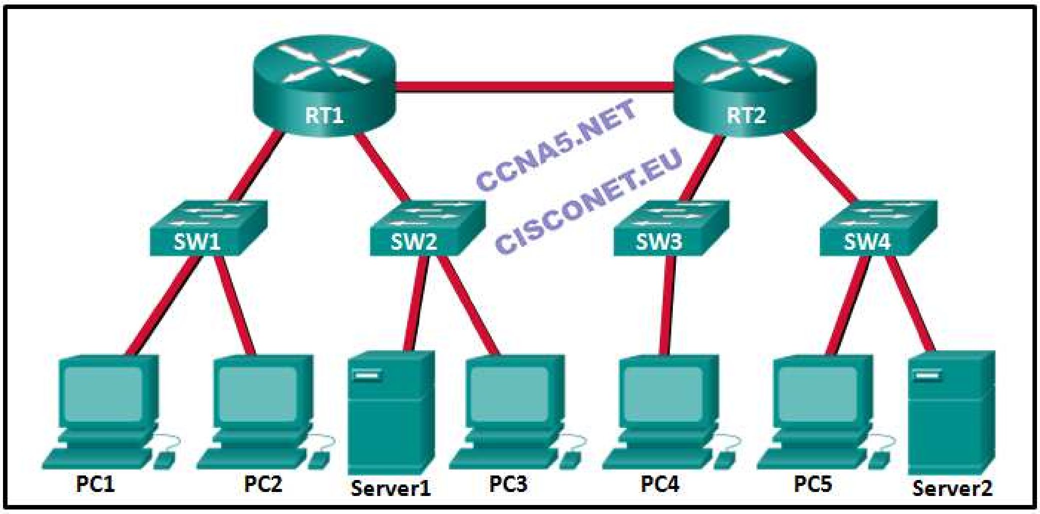
fixed-configuration switch

modular switch

stackable switch*

rackable 1U switch

20



Refer to the exhibit. Fill in the blank.

There are " **5** " broadcast domains in the topology.

CCNA 2 Chapter 2 v5.0 Exam Answers 2013

1

Which type of cable does a network administrator need to connect a PC to a switch to recover it after the Cisco IOS software fails to load?

a coaxial cable

a crossover cable

a straight-through cable

a console cable*

2

Which two basic functions are performed by network security tools? (Choose two.)

writing a security policy document for protecting networks

controlling physical access to user devices

revealing the type of information an attacker is able to gather from monitoring network traffic*

simulating attacks against the production network to determine any existing vulnerabilities*

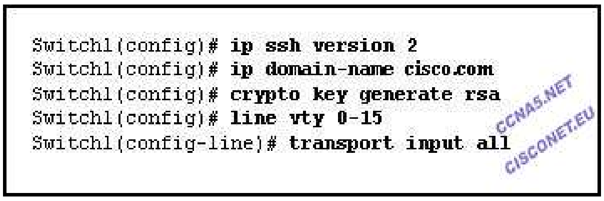
educating employees about social engineering attacks

3

While troubleshooting a connectivity problem, a network administrator notices that a switch port status LED is alternating between green and amber. What could this LED indicate?

A PC is using the wrong cable to connect to the port.
The port has an active link with normal traffic activity.
The port is administratively down.
The port has no link.
The port is experiencing errors.*

4



```
Switch1(config)# ip ssh version 2
Switch1(config)# ip domain-name cisco.com
Switch1(config)# crypto key generate rsa
Switch1(config)# line vty 0-15
Switch1(config-line)# transport input all
```

CCNA5.NET CISCONET.EU

Refer to the exhibit. The network administrator wants to configure Switch1 to allow SSH connections and prohibit Telnet connections. How should the network administrator change the displayed configuration to satisfy the requirement?

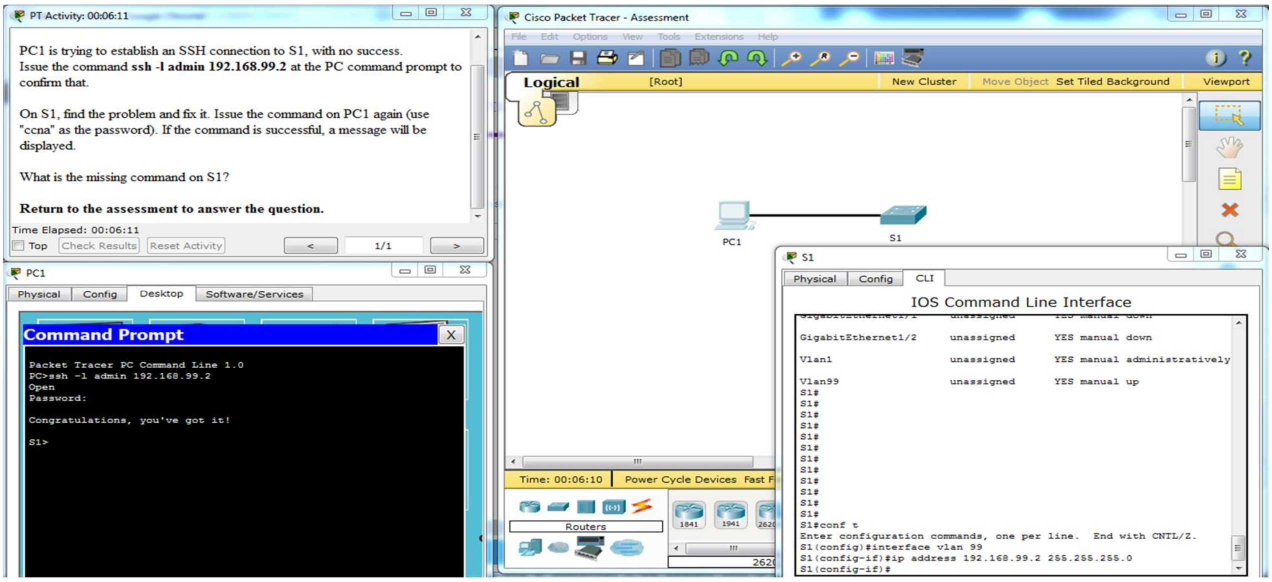
Reconfigure the RSA key.

Configure SSH on a different line.

Use SSH version 1.

Modify the transport input command.*

5



PC1 is trying to establish an SSH connection to S1, with no success.
Issue the command **ssh -l admin 192.168.99.2** at the PC command prompt to confirm that.

On S1, find the problem and fix it. Issue the command on PC1 again (use "ccna" as the password). If the command is successful, a message will be displayed.

What is the missing command on S1?

Return to the assessment to answer the question.

```
Packet Tracer PC Command Line 1.0
PC>ssh -l admin 192.168.99.2
Open
Password:

Congratulations, you've got it!

S1>
```

```
GigabitEthernet1/2     unassigned      YES manual down

Vlan1                  unassigned      YES manual administratively

Vlan99                 unassigned      YES manual up
S1#
S1#
S1#
S1#
S1#
S1#
S1#
S1#
S1#
S1#
S1#
S1#
S1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
S1(config)#interface vlan 99
S1(config-if)#ip address 192.168.99.2 255.255.255.0
S1(config-if)#
```

Open the PT Activity. Perform the tasks in the activity instructions and then answer the question.

Fill in the blank.

Do not use abbreviations.What is the missing command on S1? “ **ip address 192.168.99.2 255.255.255.0**”

The ip address 192.168.99.2 255.255.255.0 command is missing on interface vlan 99, the management VLAN.

6

Which three statements are true about using full-duplex Fast Ethernet? (Choose three.)

Performance is improved with bidirectional data flow.*

Performance is improved because the NIC is able to detect collisions.

Latency is reduced because the NIC processes frames faster.

Full-duplex Fast Ethernet offers 100 percent efficiency in both directions.*

Nodes operate in full-duplex with unidirectional data flow.

Performance is improved because the collision detect function is disabled on the device.*

7

In which type of attack does a malicious node request all available IP addresses in the address pool of a DHCP server in order to prevent legitimate hosts from obtaining network access?

CAM table overflow

DHCP starvation*

MAC address flooding

DHCP snooping

8

Which protocol or service sends broadcasts containing the Cisco IOS software version of the sending device, and the packets of which can be captured by malicious hosts on the network?

DNS

CDP*

DHCP

SSH

9

Which two statements are true regarding switch port security? (Choose two.)

The three configurable violation modes all require user intervention to re-enable ports.

The three configurable violation modes all log violations via SNMP.

After entering the sticky parameter, only MAC addresses subsequently learned are converted to secure MAC addresses.

Dynamically learned secure MAC addresses are lost when the switch reboots.*

If fewer than the maximum number of MAC addresses for a port are configured statically, dynamically learned addresses are added to CAM until the maximum number is reached.*

10

The network administrator enters the following commands on a Cisco switch:

```
Switch(config)# interface vlan1
Switch(config-if)# ip address 192.168.1.2 255.255.255.0
Switch(config-if)# no shutdown
```

What is the effect of entering these commands?

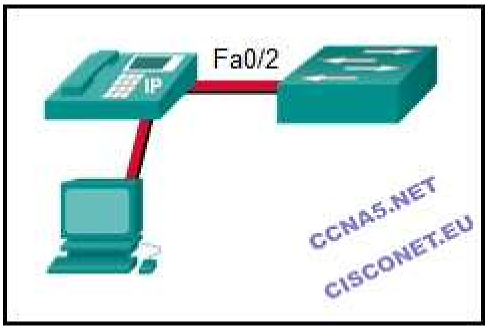
The address of the default gateway for this LAN is 192.168.1.2/24.

Users on the 192.168.1.0/24 subnet are able to ping the switch at IP address 192.168.1.2.*

All devices attached to this switch must be in the 192.168.1.0/24 subnet to communicate.

The switch is able to forward frames to remote networks.

11



Refer to the exhibit. Port Fa0/2 has already been configured appropriately. The IP phone and PC work properly. Which switch configuration would be most appropriate for port Fa0/2 if the network administrator has the following goals?
No one is allowed to disconnect the IP phone or the PC and connect some other wired device.
If a different device is connected, port Fa0/2 is shut down.
The switch should automatically detect the MAC address of the IP phone and the PC and add those addresses to the running configuration.

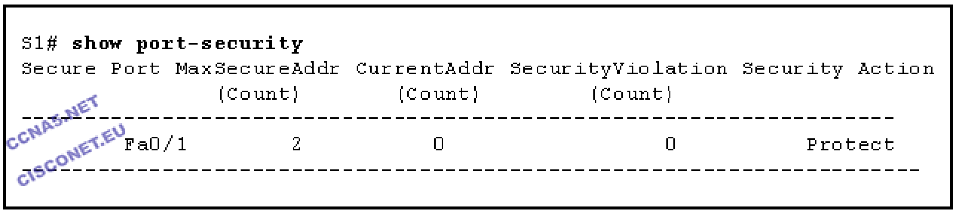
```
SWA(config-if)# switchport port-security
SWA(config-if)# switchport port-security maximum 2
SWA(config-if)# switchport port-security mac-address sticky********
```

```
SWA(config-if)# switchport port-security
SWA(config-if)# switchport port-security maximum 2
SWA(config-if)# switchport port-security mac-address sticky
SWA(config-if)# switchport port-security violation restrict
```

```
SWA(config-if)# switchport port-security mac-address sticky
SWA(config-if)# switchport port-security maximum 2
```

```
SWA(config-if)# switchport port-security
SWA(config-if)# switchport port-security mac-address sticky
```

12



```
S1# show port-security
Secure Port MaxSecureAddr CurrentAddr SecurityViolation Security Action
                (Count)        (Count)          (Count)
---------------------------------------------------------------------------
        Fa0/1         2            0                  0           Protect
---------------------------------------------------------------------------
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. Which event will take place if there is a port security violation on switch S1 interface Fa0/1?

A notification is sent.

The interface will go into error-disabled state.

A syslog message is logged.

Packets with unknown source addresses will be dropped.*

13

Which method would mitigate a MAC address flooding attack?

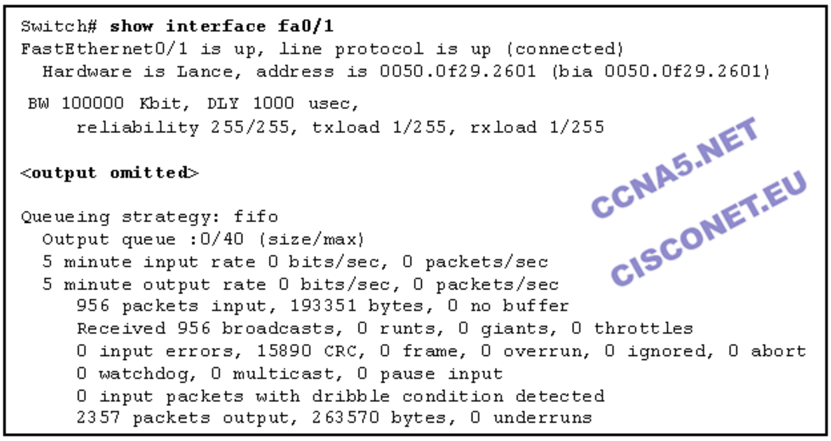
using ACLs to filter broadcast traffic on the switch

increasing the speed of switch ports

increasing the size of the CAM table

configuring port security*

14



```
Switch# show interface fa0/1
FastEthernet0/1 is up, line protocol is up (connected)
  Hardware is Lance, address is 0050.0f29.2601 (bia 0050.0f29.2601)
 BW 100000 Kbit, DLY 1000 usec,
     reliability 255/255, txload 1/255, rxload 1/255

<output omitted>

Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     956 packets input, 193351 bytes, 0 no buffer
     Received 956 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 15890 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 watchdog, 0 multicast, 0 pause input
     0 input packets with dribble condition detected
     2357 packets output, 263570 bytes, 0 underruns
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. What media issue might exist on the link connected to Fa0/1 based on the show interface command?

The interface might be configured as half-duplex.

The bandwidth parameter on the interface might be too high.

There could be too much electrical interference and noise on the link.*

The cable attaching the host to port Fa0/1 might be too long.

There could be an issue with a faulty NIC.

15
Fill in the blank.
” **Full-duplex**” communication allows both ends of a connection to transmit and receive data simultaneously.

Full-duplex communication improves the performance of a switched LAN, increasing effective bandwidth by allowing both ends of a connection to transmit and receive data simultaneously.

16
Which interface is the default location that would contain the IP address used to manage a 24-port Ethernet switch?

VLAN 1*

VLAN 99

Fa0/0

Fa0/1

interface connected to the default gateway

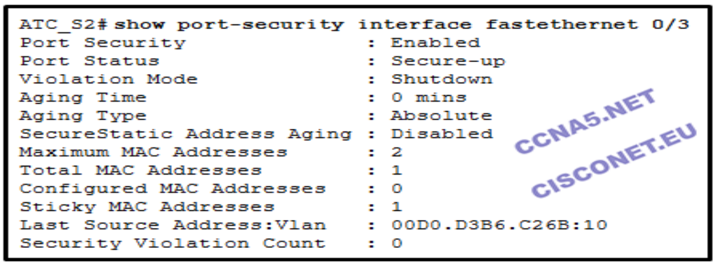
17
Which action will bring an error-disabled switch port back to an operational state?

Issue the switchport mode access command on the interface.

Remove and reconfigure port security on the interface.

Clear the MAC address table on the switch.

Issue the shutdown and then no shutdown interface commands.*
18



```
ATC_S2# show port-security interface fastethernet 0/3
Port Security                 : Enabled
Port Status                   : Secure-up
Violation Mode                : Shutdown
Aging Time                    : 0 mins
Aging Type                    : Absolute
SecureStatic Address Aging    : Disabled
Maximum MAC Addresses         : 2
Total MAC Addresses           : 1
Configured MAC Addresses      : 0
Sticky MAC Addresses          : 1
Last Source Address:Vlan      : 00D0.D3B6.C26B:10
Security Violation Count      : 0
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. What can be determined about port security from the information that is shown?

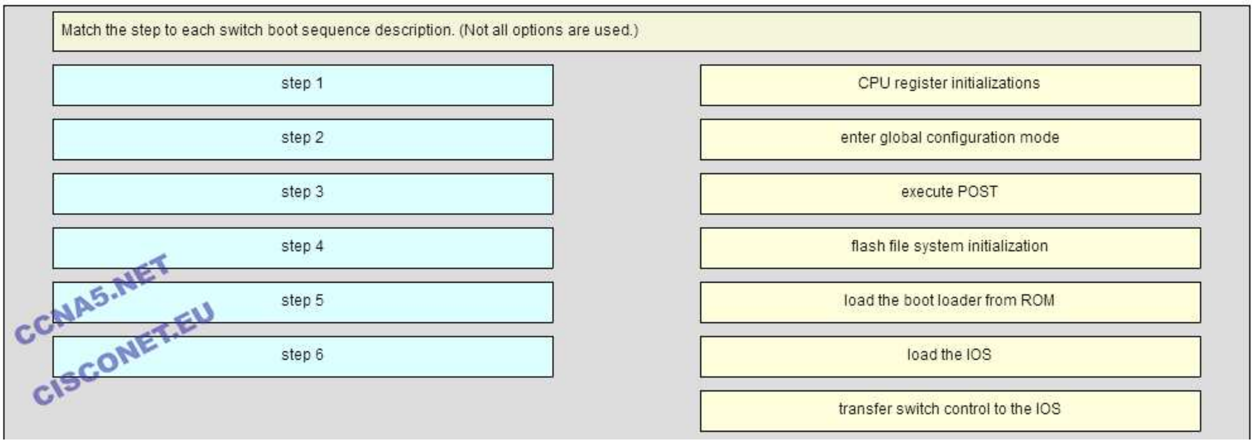
The port has been shut down.

The port has the maximum number of MAC addresses that is supported by a Layer 2 switch port which is configured for port security.

The port violation mode is the default for any port that has port security enabled.*

The port has two attached devices.

19



Match the step to each switch boot sequence description. (Not all options are used.)

- step 1
- step 2
- step 3
- step 4
- step 5
- step 6

- CPU register initializations
- enter global configuration mode
- execute POST
- flash file system initialization
- load the boot loader from ROM
- load the IOS
- transfer switch control to the IOS

Place the options in the following order:

step 3

- not scored -

step 1

step 4

step 2

step 5

step 6

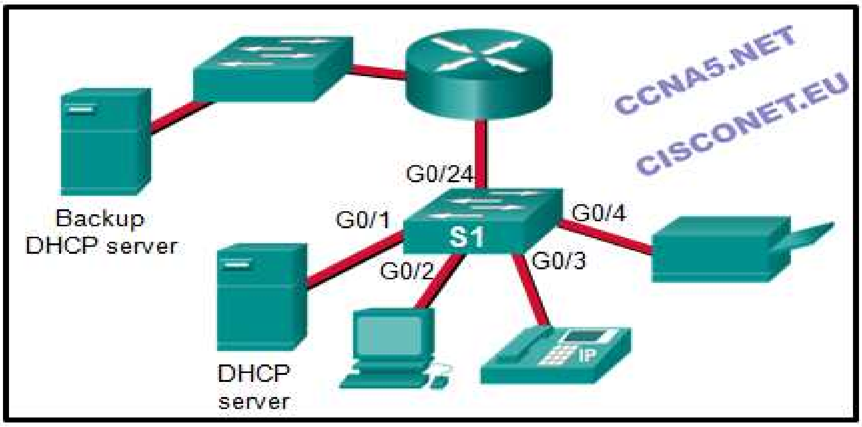
20

Fill in the blank.

When port security is enabled, a switch port uses the default violation mode of ” **shutdown** ” until specifically configured to use a different violation mode.

If no violation mode is specified when port security is enabled on a switch port, then the security violation mode defaults to shutdown.

21



Refer to the exhibit. Which S1 switch port interface or interfaces should be configured with the ip dhcp snooping trust command if best practices are implemented?

only the G0/1 and G0/24 ports*

only unused ports

only the G0/2, G0/3, and G0/4 ports

only the G0/1 port

only the G0/1, G0/2, G0/3, and G0/4 ports

22

What impact does the use of the mdix auto configuration command have on an Ethernet interface on a switch?

automatically assigns the first detected MAC address to an interface

automatically detects duplex settings

automatically detects copper cable type*

automatically detects interface speed

23

Which command displays information about the auto-MDIX setting for a specific interface?

show interfaces

show processes

show running-config

show controllers*

24

A production switch is reloaded and finishes with a Switch> prompt. What two facts can be determined? (Choose two.)

There is not enough RAM or flash on this router.

The switch did not locate the Cisco IOS in flash, so it defaulted to ROM.

A full version of the Cisco IOS was located and loaded.*

The boot process was interrupted.

POST occurred normally.*

CCNA 2 Chapter 3 v5.0 Exam Answers 2013

1

A network administrator is determining the best placement of VLAN trunk links. Which two types of point-to-point connections utilize VLAN trunking? (Choose two.)

between two switches that share a common VLAN

between a switch and a server that has an 802.1Q NIC*

between a switch and a client PC

between a switch and a network printer

between two switches that utilize multiple VLANs*

2

What happens to a port that is associated with VLAN 10 when the administrator deletes VLAN 10 from the switch?

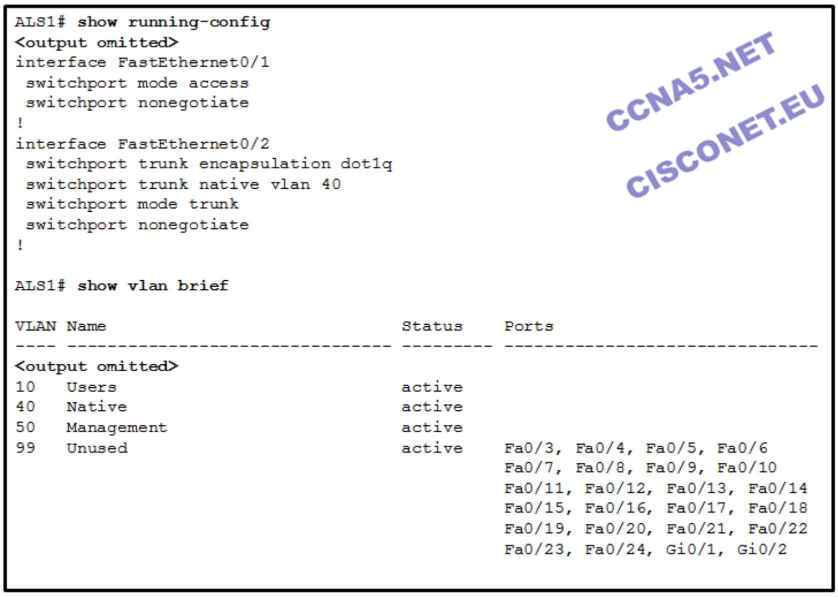
The port automatically associates itself with the native VLAN.

The port creates the VLAN again.

The port goes back to the default VLAN.

The port becomes inactive.*

3



```
ALS1# show running-config
<output omitted>
interface FastEthernet0/1
 switchport mode access
 switchport nonegotiate
!
interface FastEthernet0/2
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 40
 switchport mode trunk
 switchport nonegotiate
!

ALS1# show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
<output omitted>
10   Users                            active
40   Native                           active
50   Management                       active
99   Unused                           active    Fa0/3, Fa0/4, Fa0/5, Fa0/6
                                                Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                Fa0/23, Fa0/24, Gi0/1, Gi0/2
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. Interface Fa0/1 is connected to a PC. Fa0/2 is a trunk link to another switch. All other ports are unused. Which security best practice did the administrator forget to configure?

Configure all unused ports to a ‘black-hole’ VLAN that is not used for anything on the network.

Disable autonegotiation and set ports to either static access or static trunk.

Change the native VLAN to a fixed VLAN that is distinct from all user VLANs and to a VLAN number that is not VLAN 1.

All user ports are associated with VLANs distinct from VLAN 1 and distinct from the ‘black-hole’ VLAN.*

4

Which command is used to remove only VLAN 20 from a switch?

no switchport access vlan 20
delete flash:vlan.dat
no vlan 20*
delete vlan.dat

5

A Cisco Catalyst switch has been added to support the use of multiple VLANs as part of an enterprise network. The network technician finds it necessary to clear all VLAN information from the switch in order to incorporate a new network design. What should the technician do to accomplish this task?

Erase the startup configuration and reboot the switch.
Erase the running configuration and reboot the switch.
Delete the startup configuration and the vlan.dat file in the flash memory of the switch and reboot the switch.*
Delete the IP address that is assigned to the management VLAN and reboot the switch.

6

What is the effect of issuing a switchport access vlan 20 command on the Fa0/18 port of a switch that does not have this VLAN in the VLAN database?

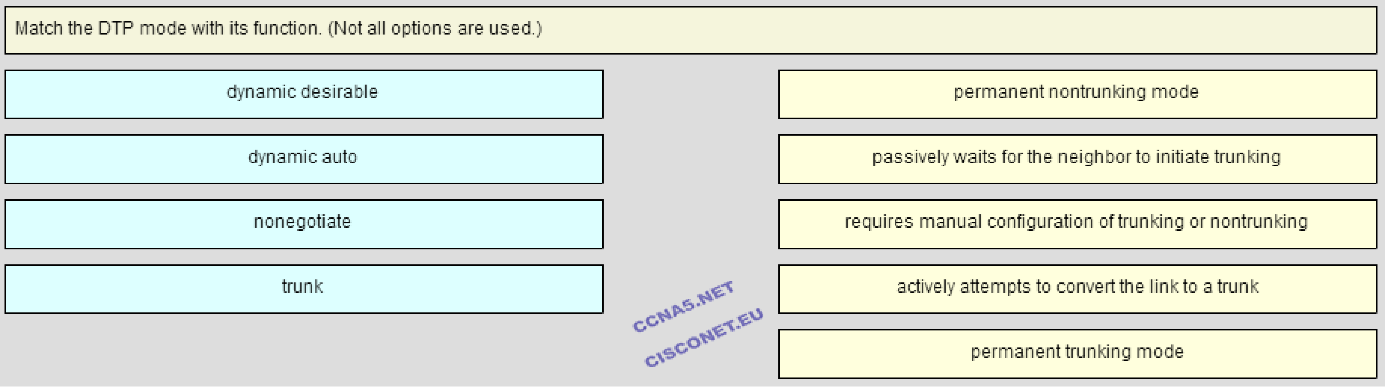
VLAN 20 will be created automatically.*
The command will have no effect on the switch.
Port Fa0/18 will be shut down.
An error stating that VLAN 20 does not exist will be displayed and VLAN 20 is not created.

7

Which command displays the encapsulation type, the voice VLAN ID, and the access mode VLAN for the Fa0/1 interface?

show mac address-table interface Fa0/1
show interfaces Fa0/1 switchport*
show interfaces trunk
show vlan brief

8



Match the DTP mode with its function. (Not all options are used.)

dynamic desirable

dynamic auto

nonegotiate

trunk

permanent nontrunking mode

passively waits for the neighbor to initiate trunking

requires manual configuration of trunking or nontrunking

actively attempts to convert the link to a trunk

permanent trunking mode

CCNA5.NET
CISCONET.EU

Place the options in the following order:

- not scored -

dynamic auto

nonegotiate

dynamic desirable

trunk

9

Port Fa0/11 on a switch is assigned to VLAN 30. If the command no switchport access vlan 30 is entered on the Fa0/11 interface, what will happen?

Port Fa0/11 will be returned to VLAN 1.*

VLAN 30 will be deleted.

An error message would be displayed.

Port Fa0/11 will be shutdown.

10

What must the network administrator do to remove Fast Ethernet port fa0/1 from VLAN 2 and assign it to VLAN 3?

Enter the no vlan 2 and the vlan 3 commands in global configuration mode.

Enter the switchport trunk native vlan 3 command in interface configuration mode.

Enter the switchport access vlan 3 command in interface configuration mode.*

Enter the no shutdown in interface configuration mode to return it to the default configuration and then configure the port for VLAN 3.

11

Which two Layer 2 security best practices would help prevent VLAN hopping attacks? (Choose two.)

Disable DTP autonegotiation on end-user ports.*

Change the management VLAN to a distinct VLAN that is not accessible by regular users.

Statically configure all ports that connect to end-user host devices to be in trunk mode.

Change the native VLAN number to one that is distinct from all user VLANs and is not VLAN 1.*

Use SSH for all remote management access.

12

In a basic VLAN hopping attack, which switch feature do attackers take advantage of?

automatic encapsulation negotiation

the default automatic trunking configuration*

an open Telnet connection

forwarding of broadcasts

13

A Cisco switch currently allows traffic tagged with VLANs 10 and 20 across trunk port Fa0/5. What is the effect of issuing a switchport trunk allowed vlan 30 command on Fa0/5?

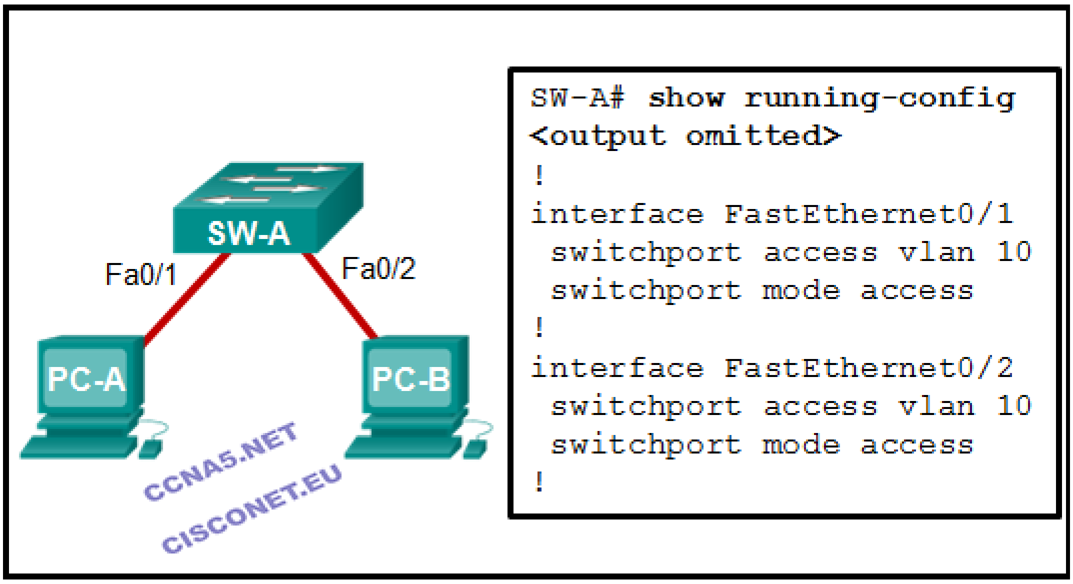
It allows only VLAN 30 on Fa0/5.*

It allows a native VLAN of 30 to be implemented on Fa0/5.

It allows VLANs 1 to 30 on Fa0/5.

It allows VLANs 10, 20, and 30 on Fa0/5.

14



```
SW-A# show running-config
<output omitted>
!
interface FastEthernet0/1
 switchport access vlan 10
 switchport mode access
!
interface FastEthernet0/2
 switchport access vlan 10
 switchport mode access
!
```

Refer to the exhibit. A frame is traveling between PC-A and PC-B through the switch. Which statement is true concerning VLAN tagging of the frame?

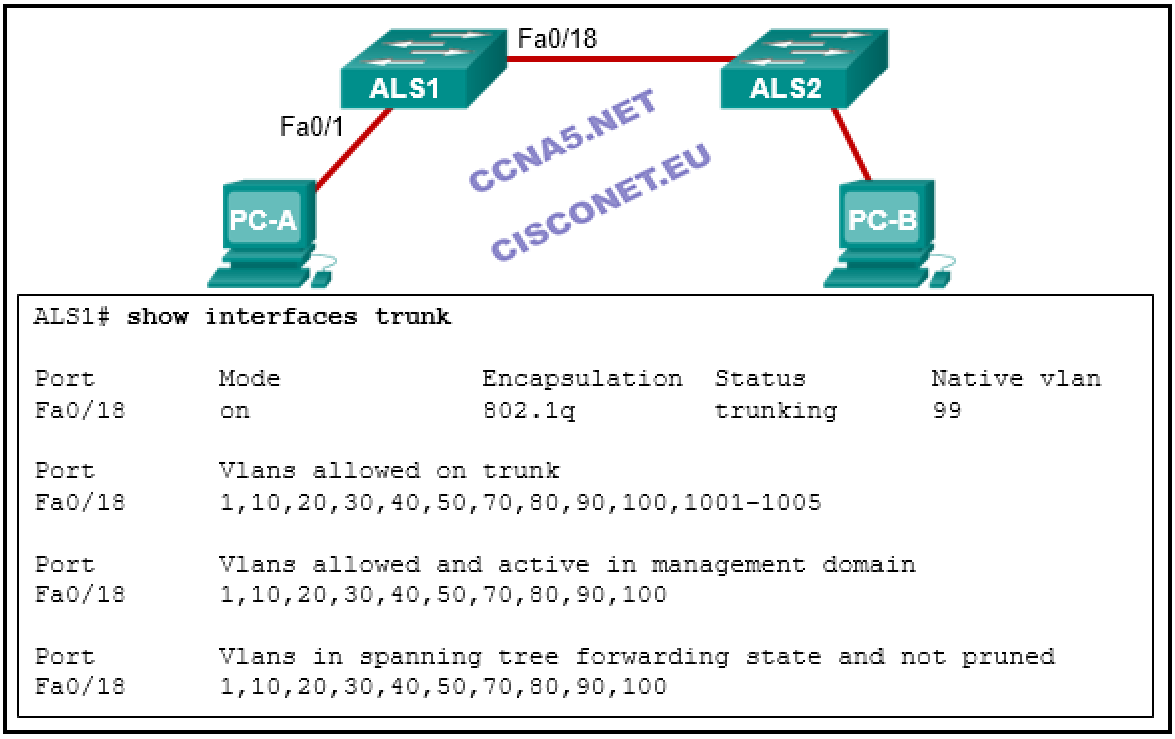
No VLAN tag is added to the frame.*

A VLAN tag is added when the frame is accepted by the switch.

A VLAN tag is added when the frame is forwarded out the port to PC-B.

A VLAN tag is added when the frame leaves PC-A.

15



CCNA5.NET
CISCONET.EU

```
ALS1# show interfaces trunk

Port        Mode             Encapsulation  Status        Native vlan
Fa0/18      on               802.1q         trunking      99

Port        Vlans allowed on trunk
Fa0/18      1,10,20,30,40,50,70,80,90,100,1001-1005

Port        Vlans allowed and active in management domain
Fa0/18      1,10,20,30,40,50,70,80,90,100

Port        Vlans in spanning tree forwarding state and not pruned
Fa0/18      1,10,20,30,40,50,70,80,90,100
```

Refer to the exhibit. PC-A and PC-B are both in VLAN 60. PC-A is unable to communicate with PC-B. What is the problem?

The native VLAN is being pruned from the link.
The VLAN that is used by PC-A is not in the list of allowed VLANs on the trunk.*
The trunk has been configured with the switchport nonegotiate command.
The native VLAN should be VLAN 60.

16

What VLANs are allowed across a trunk when the range of allowed VLANs is set to the default value?

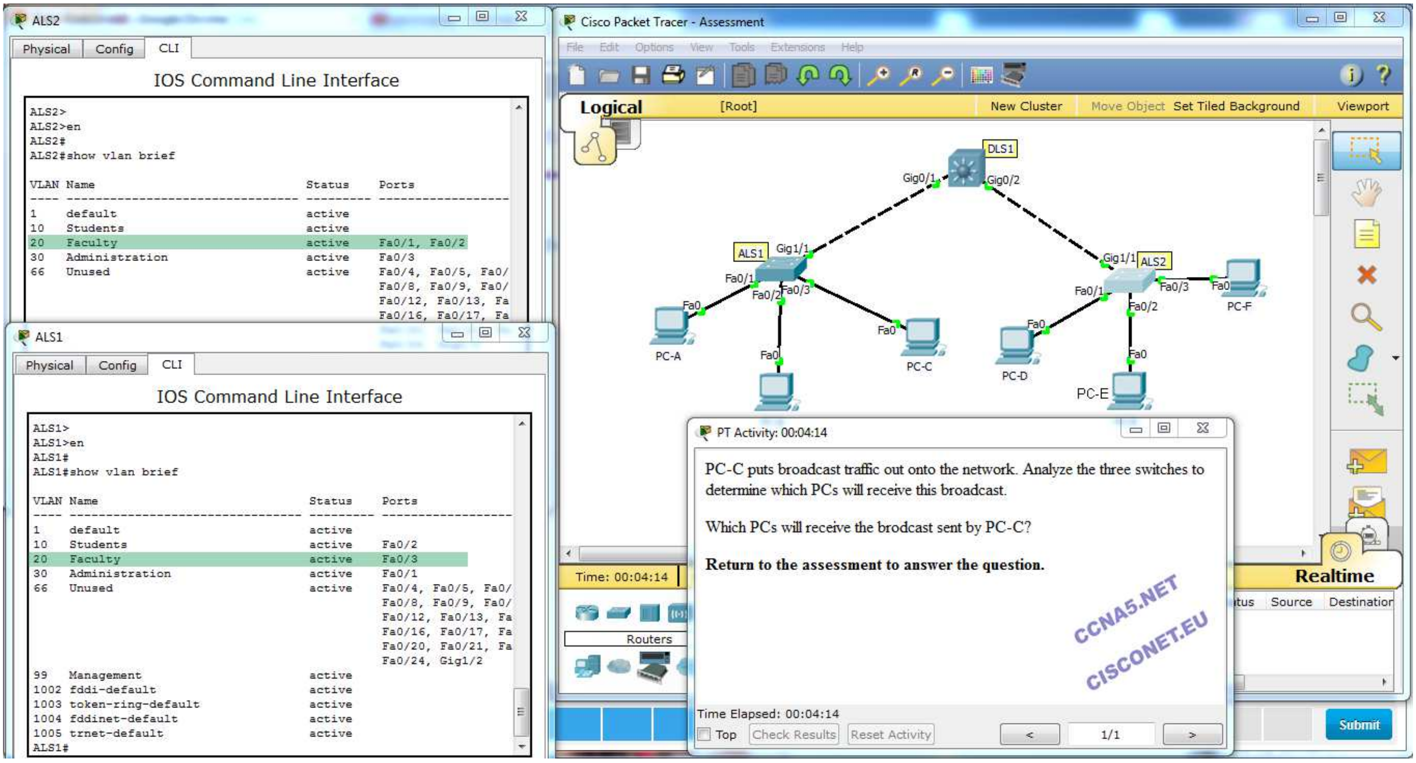
All VLANs will be allowed across the trunk.*
Only the native VLAN will be allowed across the trunk.
The switches will negotiate via VTP which VLANs to allow across the trunk.
Only VLAN 1 will be allowed across the trunk.

17

Under which two occasions should an administrator disable DTP while managing a local area network? (Choose two.)

on links that should not be trunking*
when connecting a Cisco switch to a non-Cisco switch*
on links that should dynamically attempt trunking
when a neighbor switch uses a DTP mode of dynamic auto
when a neighbor switch uses a DTP mode of dynamic desirable

18



```
ALS2>
ALS2>en
ALS2#
ALS2#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------
1    default                          active
10   Students                         active
20   Faculty                          active    Fa0/1, Fa0/2
30   Administration                   active    Fa0/3
66   Unused                           active    Fa0/4, Fa0/5, Fa0/
                                                Fa0/8, Fa0/9, Fa0/
                                                Fa0/12, Fa0/13, Fa
                                                Fa0/16, Fa0/17, Fa
```

```
ALS1>
ALS1>en
ALS1#
ALS1#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------
1    default                          active
10   Students                         active    Fa0/2
20   Faculty                          active    Fa0/3
30   Administration                   active    Fa0/1
66   Unused                           active    Fa0/4, Fa0/5, Fa0/
                                                Fa0/8, Fa0/9, Fa0/
                                                Fa0/12, Fa0/13, Fa
                                                Fa0/16, Fa0/17, Fa
                                                Fa0/20, Fa0/21, Fa
                                                Fa0/24, Gig1/2
99   Management                       active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
ALS1#
```

PC-C puts broadcast traffic out onto the network. Analyze the three switches to determine which PCs will receive this broadcast.

Which PCs will receive the brodcast sent by PC-C?

Return to the assessment to answer the question.

Time Elapsed: 00:04:14

Open the PT Activity. Perform the tasks in the activity instructions and then answer the question.

Which PCs will receive the broadcast sent by PC-C?

PC-D, PC-E*

PC-A, PC-B, PC-D, PC-E

PC-A, PC-B

PC-A, PC-B, PC-D, PC-E, PC-F

PC-A, PC-B, PC-E

19

Which two statements are true about VLAN implementation? (Choose two.)

The network load increases significantly because of added trunking information.

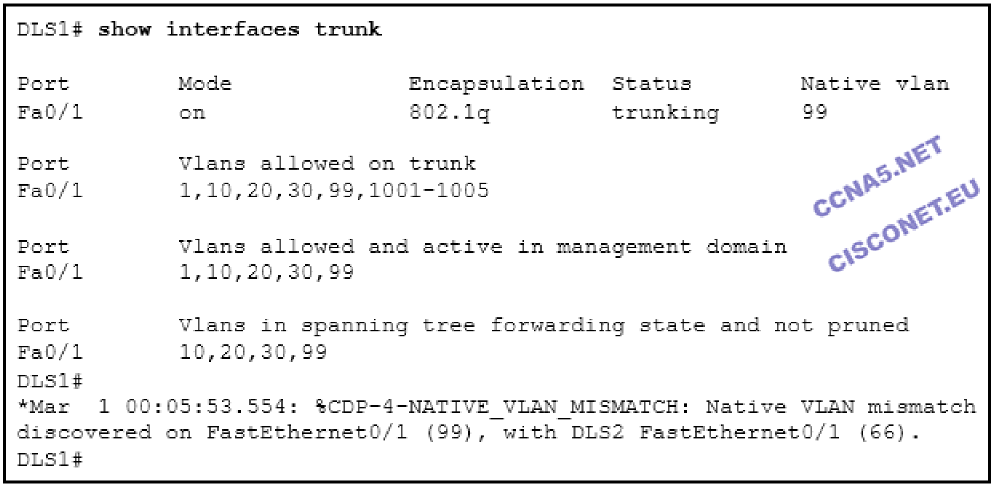
Devices in one VLAN do not hear the broadcasts from devices in another VLAN.*

The size of the collision domain is reduced.

VLANs logically group hosts, regardless of physical location.*

The number of required switches in a network decreases.

20



```
DLS1# show interfaces trunk

Port        Mode             Encapsulation  Status        Native vlan
Fa0/1       on               802.1q         trunking      99

Port        Vlans allowed on trunk
Fa0/1       1,10,20,30,99,1001-1005

Port        Vlans allowed and active in management domain
Fa0/1       1,10,20,30,99

Port        Vlans in spanning tree forwarding state and not pruned
Fa0/1       10,20,30,99
DLS1#
*Mar  1 00:05:53.554: %CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch
discovered on FastEthernet0/1 (99), with DLS2 FastEthernet0/1 (66).
DLS1#
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. DLS1 is connected to another switch, DLS2, via a trunk link. A host that is connected to DLS1 is not able to communicate to a host that is connected to DLS2, even though they are both in VLAN 99. Which command should be added to Fa0/1 on DLS1 to correct the problem?

switchport trunk allowed vlan add 99
switchport trunk native vlan 66*
switchport mode dynamic auto
switchport nonegotiate

21
Which switch feature ensures that no unicast, multicast, or broadcast traffic is passed between ports that are configured with this feature?

switch port security
PVLAN protected port*
ACL
VLAN

22
Fill in the blank. Use the full command syntax.
The " **show vlan brief** " command displays the VLAN assignment for all ports as well as the existing VLANs on the switch.

23
Which three statements accurately describe VLAN types? (Choose three).

An 802.1Q trunk port, with a native VLAN assigned, supports both tagged and untagged traffic.*
A management VLAN is any VLAN that is configured to access management features of the switch.*
A data VLAN is used to carry VLAN management data and user-generated traffic.
Voice VLANs are used to support user phone and e-mail traffic on a network.
VLAN 1 is always used as the management VLAN.
After the initial boot of an unconfigured switch, all ports are members of the default VLAN.*

24

Which command should the network administrator implement to prevent the transfer of DTP frames between a Cisco switch and a non-Cisco switch?

S1(config-if)# switchport mode trunk

S1(config-if)# switchport mode access

S1(config-if)# switchport nonegotiate*

S1(config-if)# switchport mode dynamic desirable

S1(config-if)# switchport trunk allowed vlan none

CCNA 2 Chapter 4 v5.0 Exam Answers 2013

1

What type of IPv6 address is required as a minimum on IPv6 enabled interfaces?

static

global unicast

link-local*

loopback

unique local

2

In order for packets to be sent to a remote destination, what three pieces of information must be configured on a host? (Choose three.)

default gateway*

hostname

DNS server address

DHCP server address

IP address*

subnet mask*

3

What two pieces of information are displayed in the output of the show ip interface brief command? (Choose two.)

MAC addresses

Layer 1 statuses*

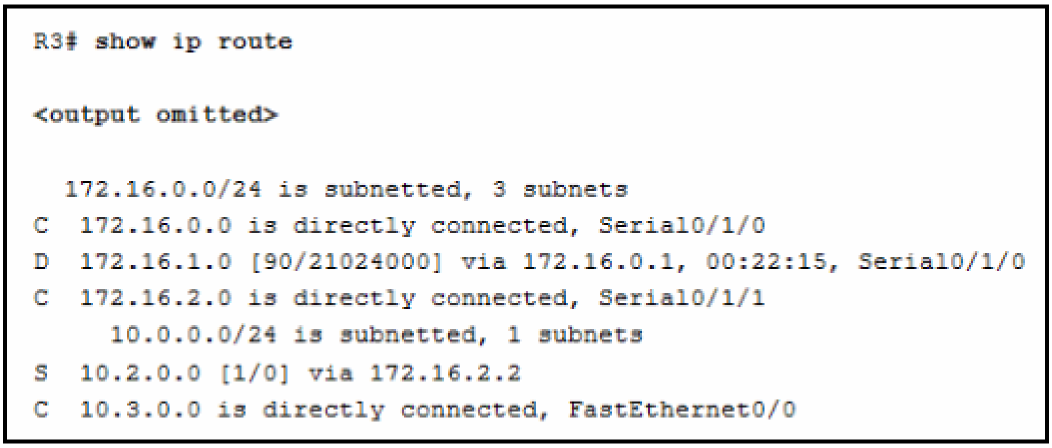
IP addresses*

next-hop addresses

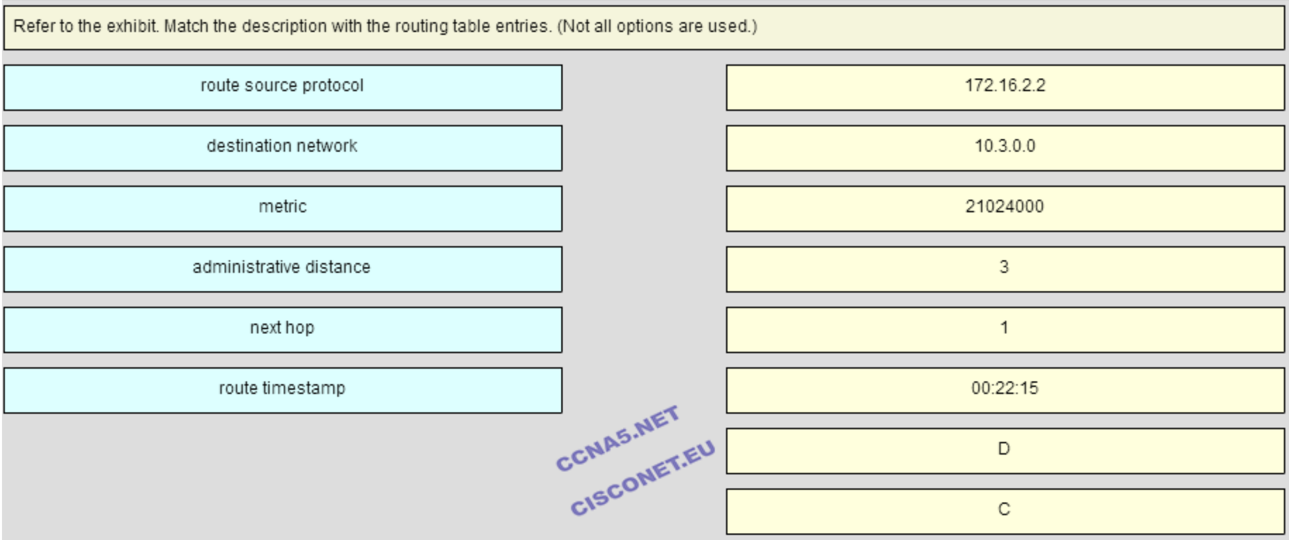
interface descriptions

speed and duplex settings

4



```
R3# show ip route

<output omitted>

  172.16.0.0/24 is subnetted, 3 subnets
C  172.16.0.0 is directly connected, Serial0/1/0
D  172.16.1.0 [90/21024000] via 172.16.0.1, 00:22:15, Serial0/1/0
C  172.16.2.0 is directly connected, Serial0/1/1
     10.0.0.0/24 is subnetted, 1 subnets
S  10.2.0.0 [1/0] via 172.16.2.2
C  10.3.0.0 is directly connected, FastEthernet0/0
```



Refer to the exhibit. Match the description with the routing table entries. (Not all options are used.)

route source protocol
destination network
metric
administrative distance
next hop
route timestamp

172.16.2.2
10.3.0.0
21024000
3
1
00:22:15
D
C

CCNA5.NET
CISCONET.EU

Place the options in the following order:

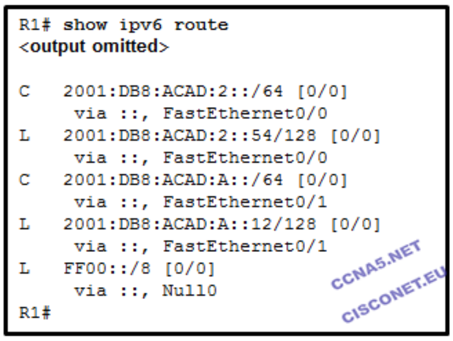
next hop
destination network
metric
- not scored -
administrative distance
route timestamp
route source protocol
- not scored -

5

Which two items are used by a host device when performing an ANDing operation to determine if a destination address is on the same local network? (Choose two.)

destination MAC address
network number
destination IP address*
source MAC address
subnet mask*

6



```
R1# show ipv6 route
<output omitted>

C   2001:DB8:ACAD:2::/64 [0/0]
     via ::, FastEthernet0/0
L   2001:DB8:ACAD:2::54/128 [0/0]
     via ::, FastEthernet0/0
C   2001:DB8:ACAD:A::/64 [0/0]
     via ::, FastEthernet0/1
L   2001:DB8:ACAD:A::12/128 [0/0]
     via ::, FastEthernet0/1
L   FF00::/8 [0/0]
     via ::, Null0
R1#
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. A network administrator issues the show ipv6 route command on R1. What two conclusions can be drawn from the routing table? (Choose two.)

Packets that are destined for the network 2001:DB8:ACAD:2::/64 will be forwarded through Fa0/1.

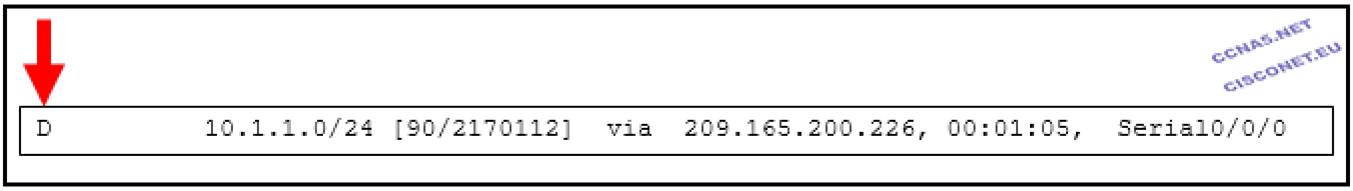
R1 does not know a route to any remote networks.*

The interface Fa0/1 is configured with IPv6 address 2001:DB8:ACAD:A::12.*

Packets that are destined for the network 2001:DB8:ACAD:2::54/128 will be forwarded through Fa0/0.

The network FF00::/8 is installed through a static route command.

7



```
D        10.1.1.0/24 [90/2170112]  via  209.165.200.226, 00:01:05,  Serial0/0/0
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. What is the purpose of the highlighted field in the line that is displayed from the show ip route command?

It indicates that this is a directly connected route.

It indicates that this route has been deleted from the routing table.

It indicates that this route was learned via EIGRP.*

It indicates that this is a default route.

8

Which two statements correctly describe the concepts of administrative distance and metric? (Choose two.)

The metric varies depending which Layer 3 protocol is being routed, such as IP.

A router first installs routes with higher administrative distances.

The value of the administrative distance can not be altered by the network administrator.

Routes with the smallest metric to a destination indicate the best path.*

Administrative distance refers to the trustworthiness of a particular route.*

The metric is always determined based on hop count.

9

What are two functions of a router? (Choose two.)

It manages the VLAN database.

It increases the size of the broadcast domain.

It controls the flow of data via the use of Layer 2 addresses.

It determines the best path to send packets.*

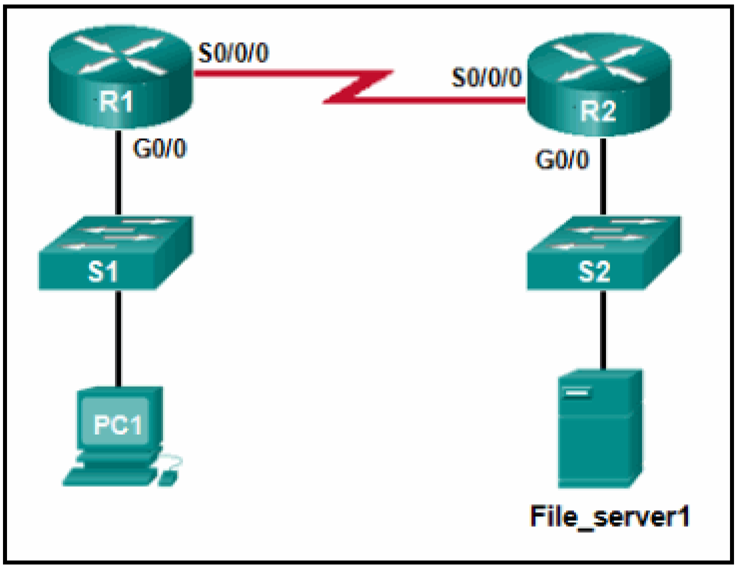
It connects multiple IP networks.*

10

A packet moves from a host on one network to a device on a remote network within the same company. If NAT is not performed on the packet, which two items remain unchanged during the transfer of the packet from source to destination? (Choose two.)

destination MAC address
source ARP table
source IP address*
destination IP address*
source MAC address
Layer 2 header

11



Refer to the exhibit. PC1 attempts to connect to File_server1 and sends an ARP request to obtain a destination MAC address. Which MAC address will PC1 receive in the ARP reply?

the MAC address of File_server1
the MAC address of S2
the MAC address of the G0/0 interface on R2
the MAC address of S1
the MAC address of the G0/0 interface on R1*

12
A network administrator configures the interface fa0/0 on the router R1 with the command ip address 172.16.1.254 255.255.255.0. However, when the administrator issues the command show ip route, the routing table does not show the directly connected network. What is the possible cause of the problem?

The interface fa0/0 has not been activated.*
No packets with a destination network of 172.16.1.0 have been sent to R1.
The subnet mask is incorrect for the IPv4 address.
The configuration needs to be saved first.

13
Which command is used to configure an IPv6 address on a router interface so that the router will combine a manually specified network prefix with an automatically generated interface identifier?

ipv6 enable

ipv6 address ipv6-address/prefix-length eui-64*

ipv6 address ipv6-address/prefix-length link-local

ipv6 address ipv6-address/prefix-length

14

Fill in the blank.

When a router receives a packet, it examines the destination address of the packet and looks in the ”**routing** ” table to determine the best path to use to forward the packet.

15

A network administrator configures a router by the command ip route 0.0.0.0 0.0.0.0 209.165.200.226. What is the purpose of this command?

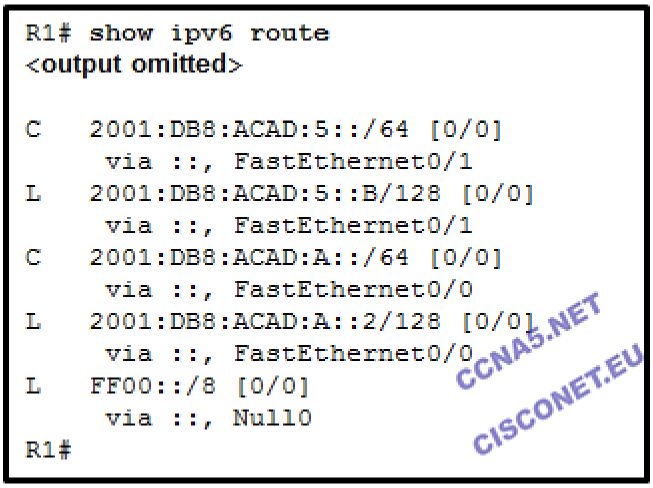
to provide a route to forward packets for which there is no route in the routing table*

to forward packets destined for the network 0.0.0.0 to the device with IP address 209.165.200.226

to add a dynamic route for the destination network 0.0.0.0 to the routing table

to forward all packets to the device with IP address 209.165.200.226

16



```
R1# show ipv6 route
<output omitted>

C   2001:DB8:ACAD:5::/64 [0/0]
     via ::, FastEthernet0/1
L   2001:DB8:ACAD:5::B/128 [0/0]
     via ::, FastEthernet0/1
C   2001:DB8:ACAD:A::/64 [0/0]
     via ::, FastEthernet0/0
L   2001:DB8:ACAD:A::2/128 [0/0]
     via ::, FastEthernet0/0
L   FF00::/8 [0/0]
     via ::, Null0
R1#
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. A network administrator issues the show ipv6 route command on R1. Which two types of routes are displayed in the routing table? (Choose two.)

route that is learned through the EIGRP routing protocol

directly connected network*

route that is learned through the OSPF routing protocol

static route

local host route*

17

What address changes as a packet travels across multiple Layer 3 Ethernet hops to its final destination?

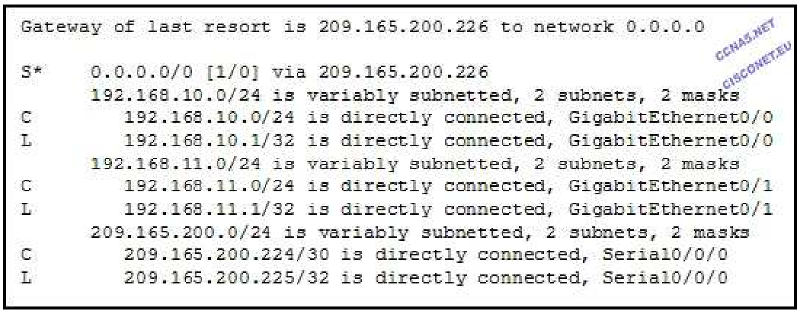
source Layer 2 address*

source IP

destination port

destination IP

18



```
Gateway of last resort is 209.165.200.226 to network 0.0.0.0

S*    0.0.0.0/0 [1/0] via 209.165.200.226
      192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.10.0/24 is directly connected, GigabitEthernet0/0
L        192.168.10.1/32 is directly connected, GigabitEthernet0/0
      192.168.11.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.11.0/24 is directly connected, GigabitEthernet0/1
L        192.168.11.1/32 is directly connected, GigabitEthernet0/1
      209.165.200.0/24 is variably subnetted, 2 subnets, 2 masks
C        209.165.200.224/30 is directly connected, Serial0/0/0
L        209.165.200.225/32 is directly connected, Serial0/0/0
```

CCNA5.NET CISCONET.EU

Refer to the exhibit. What will the router do with a packet that has a destination IP address of 192.168.12.227?

Drop the packet.

Send the packet out the GigabitEthernet0/1 interface.

Send the packet out the Serial0/0/0 interface.*

Send the packet out the GigabitEthernet0/0 interface.

19

A network administrator is implementing dynamic routing protocols for a company. Which command can the administrator issue on a router to display the supported routing protocols?

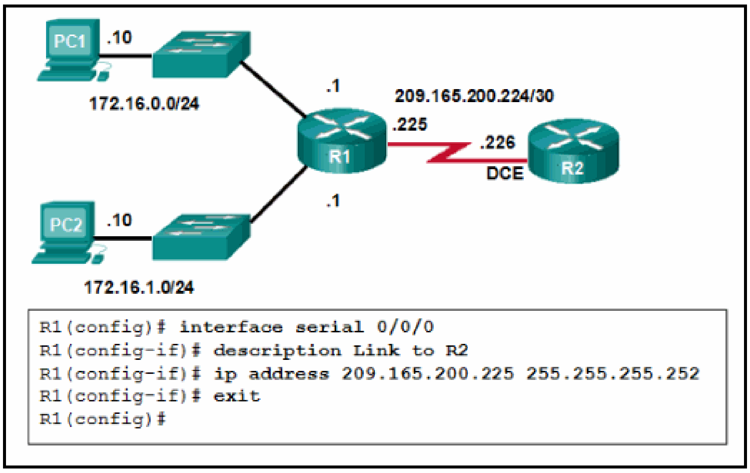
Router(config)# router ?*

Router(config)# ip forward-protocol ?

Router(config)# service ?

Router(config)# ip route ?

20



```
R1(config)# interface serial 0/0/0
R1(config-if)# description Link to R2
R1(config-if)# ip address 209.165.200.225 255.255.255.252
R1(config-if)# exit
R1(config)#
```

Refer to the exhibit. A network administrator has configured R1 as shown. When the administrator checks the status of the serial interface, the interface is shown as being

administratively down. What additional command must be entered on the serial interface of R1 to bring the interface up?

no shutdown*

end

clockrate 128000

IPv6 enable

21

What is one feature that distinguishes routers from Layer 2 switches?

Switches use tables of information to determine how to process data traffic. Routers do not.

Switches move packets from one physical interface to another. Routers do not.

Routers support a variety of interface types. Switches typically support Ethernet interfaces.*

Routers can be configured with IP addresses. Switches cannot.

22

Which statement describes a route that has been learned dynamically?

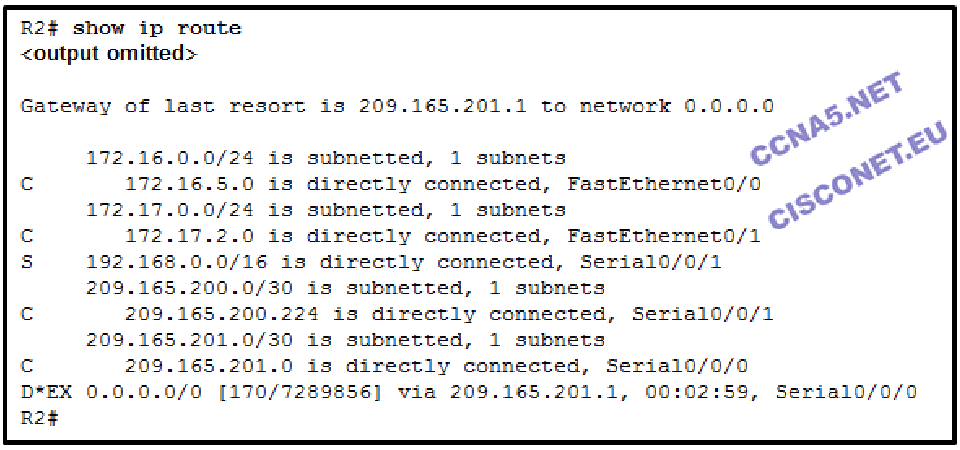
It is identified by the prefix C in the routing table.

It is automatically updated and maintained by routing protocols.*

It is unaffected by changes in the topology of the network.

It has an administrative distance of 1.

23



```
R2# show ip route
<output omitted>

Gateway of last resort is 209.165.201.1 to network 0.0.0.0

     172.16.0.0/24 is subnetted, 1 subnets
C       172.16.5.0 is directly connected, FastEthernet0/0
     172.17.0.0/24 is subnetted, 1 subnets
C       172.17.2.0 is directly connected, FastEthernet0/1
S    192.168.0.0/16 is directly connected, Serial0/0/1
     209.165.200.0/30 is subnetted, 1 subnets
C       209.165.200.224 is directly connected, Serial0/0/1
     209.165.201.0/30 is subnetted, 1 subnets
C       209.165.201.0 is directly connected, Serial0/0/0
D*EX 0.0.0.0/0 [170/7289856] via 209.165.201.1, 00:02:59, Serial0/0/0
R2#
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. A network administrator issues the show ip route command on R2. What two types of routes are installed in the routing table? (Choose two.)

directly connected networks*

routes that are learned through the OSPF routing protocol

a configured default route

routes that are learned through the EIGRP routing protocol*

a configured static route to the network 209.165.200.224

24

When a computer is pinging another computer for the first time, what type of message does it place on the network to determine the MAC address of the other device?

an RFI (Request for Information) message

an ARP request*

an ICMP ping

a multicast to any Layer 3 devices that are connected to the local network

CCNA 2 Chapter 5 v5.0 Exam Answers 2013

1

Fill in the blank. Do not use abbreviations.

A network engineer is troubleshooting the configuration of new VLANs on a network. Which command is used to display the list of VLANs that exists on the switch? ” **show vlan** ”

2

What is a disadvantage of using multilayer switches for inter-VLAN routing?

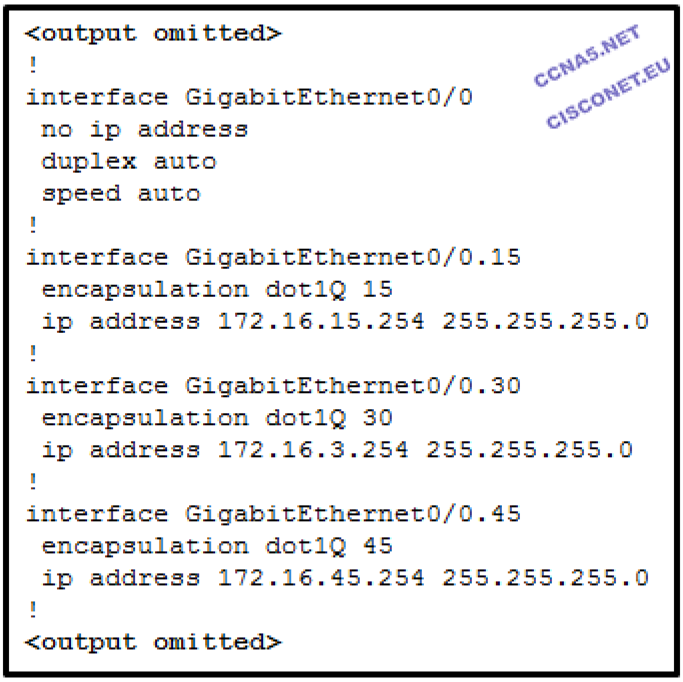
Multilayer switches have higher latency for Layer 3 routing.

Spanning tree must be disabled in order to implement routing on a multilayer switch.

Multilayer switches are more expensive than router-on-a-stick implementations.*

Multilayer switches are limited to using trunk links for Layer 3 routing.

3



```
<output omitted>
!
interface GigabitEthernet0/0
 no ip address
 duplex auto
 speed auto
!
interface GigabitEthernet0/0.15
 encapsulation dot1Q 15
 ip address 172.16.15.254 255.255.255.0
!
interface GigabitEthernet0/0.30
 encapsulation dot1Q 30
 ip address 172.16.3.254 255.255.255.0
!
interface GigabitEthernet0/0.45
 encapsulation dot1Q 45
 ip address 172.16.45.254 255.255.255.0
!
<output omitted>
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. A router-on-a-stick configuration was implemented for VLANs 15, 30, and 45, according to the show running-config command output. PCs on VLAN 45 that are using the 172.16.45.0 /24 network are having trouble connecting to PCs on VLAN 30 in the 172.16.30.0 /24 network. Which error is most likely causing this problem?

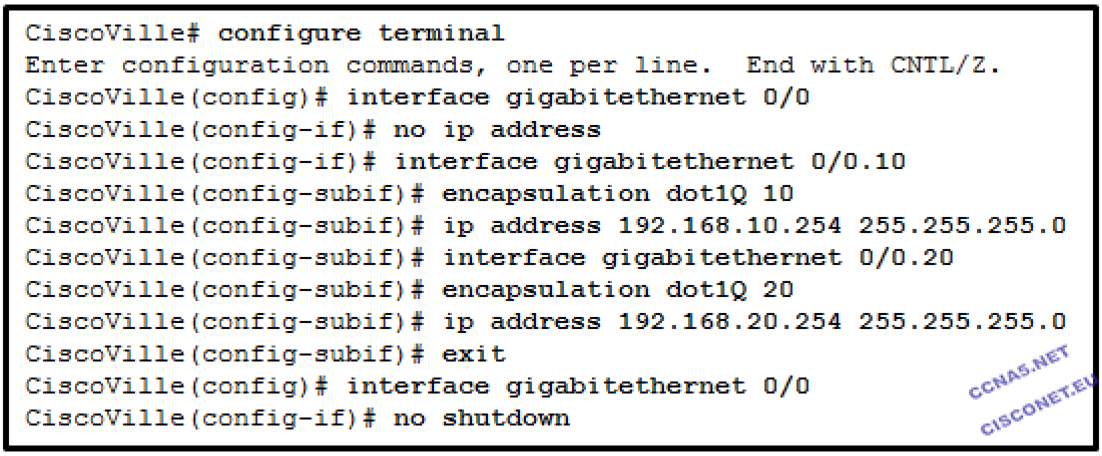
The command no shutdown is missing on GigabitEthernet 0/0.30

The GigabitEthernet 0/0 interface is missing an IP address.

There is an incorrect IP address configured on GigabitEthernet 0/0.30.*

The wrong VLAN has been configured on GigabitEthernet 0/0.45

4



```
CiscoVille# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
CiscoVille(config)# interface gigabitethernet 0/0
CiscoVille(config-if)# no ip address
CiscoVille(config-if)# interface gigabitethernet 0/0.10
CiscoVille(config-subif)# encapsulation dot1Q 10
CiscoVille(config-subif)# ip address 192.168.10.254 255.255.255.0
CiscoVille(config-subif)# interface gigabitethernet 0/0.20
CiscoVille(config-subif)# encapsulation dot1Q 20
CiscoVille(config-subif)# ip address 192.168.20.254 255.255.255.0
CiscoVille(config-subif)# exit
CiscoVille(config)# interface gigabitethernet 0/0
CiscoVille(config-if)# no shutdown
```

Refer to the exhibit. A network administrator has configured router CiscoVille with the above commands to provide inter-VLAN routing. What command will be required on a switch that is connected to the Gi0/0 interface on router CiscoVille to allow inter-VLAN routing?

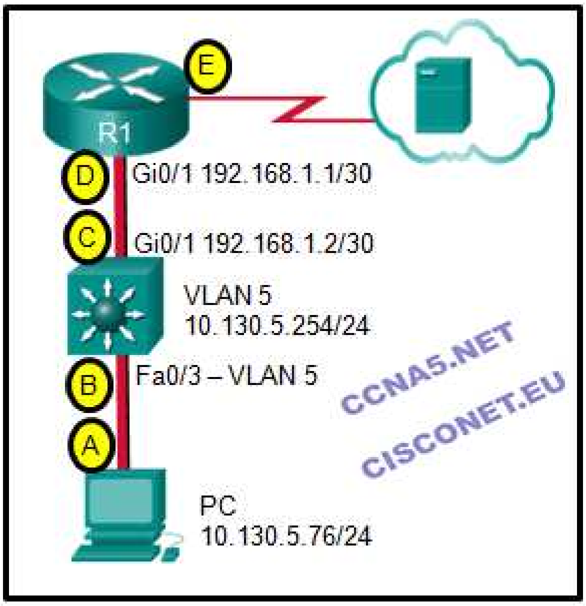
switchport mode trunk*

switchport mode dynamic desirable

switchport mode access

no switchport

5



Refer to the exhibit. The switch does the routing for the hosts that connect to VLAN 5. If the PC accesses a web server from the Internet, at what point will a VLAN number be added to the frame?

point A

point B

point D

point C

point E

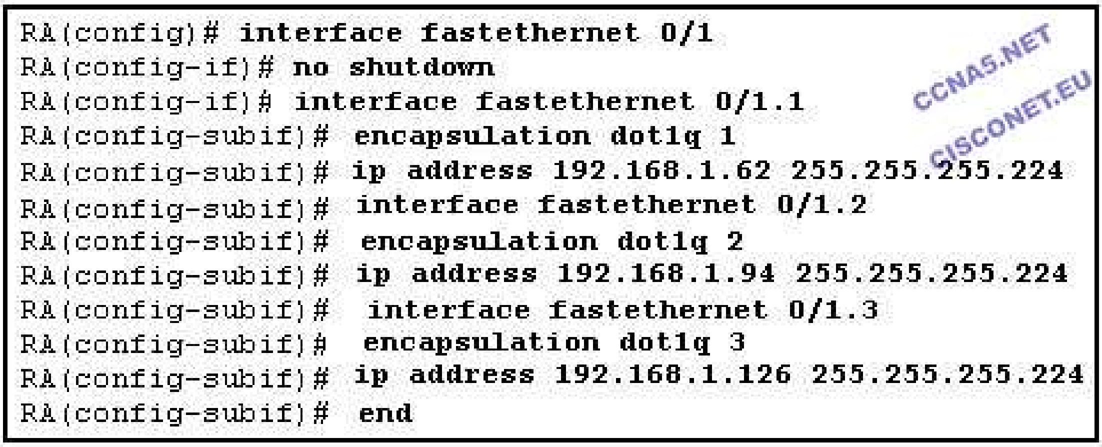
No VLAN number is added to the frame in this design.*

6

Inter-VLAN communication is not occurring in a particular building of a school. Which two commands could the network administrator use to verify that inter-VLAN communication was working properly between a router and a Layer 2 switch when the router-on-a-stick design method is implemented? (Choose two.)

From the switch, issue the show vlans command.
From the router, issue the show interface interface command.
From the switch, issue the show interface trunk command.*
From the switch, issue the show interface interface command.
From the router, issue the show ip route command.*
From the router, issue the show interface trunk command.

7



```
RA(config)# interface fastethernet 0/1
RA(config-if)# no shutdown
RA(config-if)# interface fastethernet 0/1.1
RA(config-subif)# encapsulation dot1q 1
RA(config-subif)# ip address 192.168.1.62 255.255.255.224
RA(config-subif)# interface fastethernet 0/1.2
RA(config-subif)# encapsulation dot1q 2
RA(config-subif)# ip address 192.168.1.94 255.255.255.224
RA(config-subif)# interface fastethernet 0/1.3
RA(config-subif)# encapsulation dot1q 3
RA(config-subif)# ip address 192.168.1.126 255.255.255.224
RA(config-subif)# end
```

Refer to the exhibit. Router RA receives a packet with a source address of 192.168.1.35 and a destination address of 192.168.1.85. What will the router do with this packet?

The router will drop the packet.
The router will forward the packet out interface FastEthernet 0/1.2 and interface FastEthernet 0/1.3.
The router will forward the packet out interface FastEthernet 0/1.1.
The router will forward the packet out interface FastEthernet 0/1.2.*
The router will forward the packet out interface FastEthernet 0/1.3.

8

What condition is required to enable Layer 3 switching?

All participating switches must have unique VLAN numbers.
Inter-VLAN portions of Layer 3 switching must use router-on-a-stick.
The Layer 3 switch must have IP routing enabled.*
All routed subnets must be on the same VLAN.

9

Which type of inter-VLAN communication design requires the configuration of multiple subinterfaces?

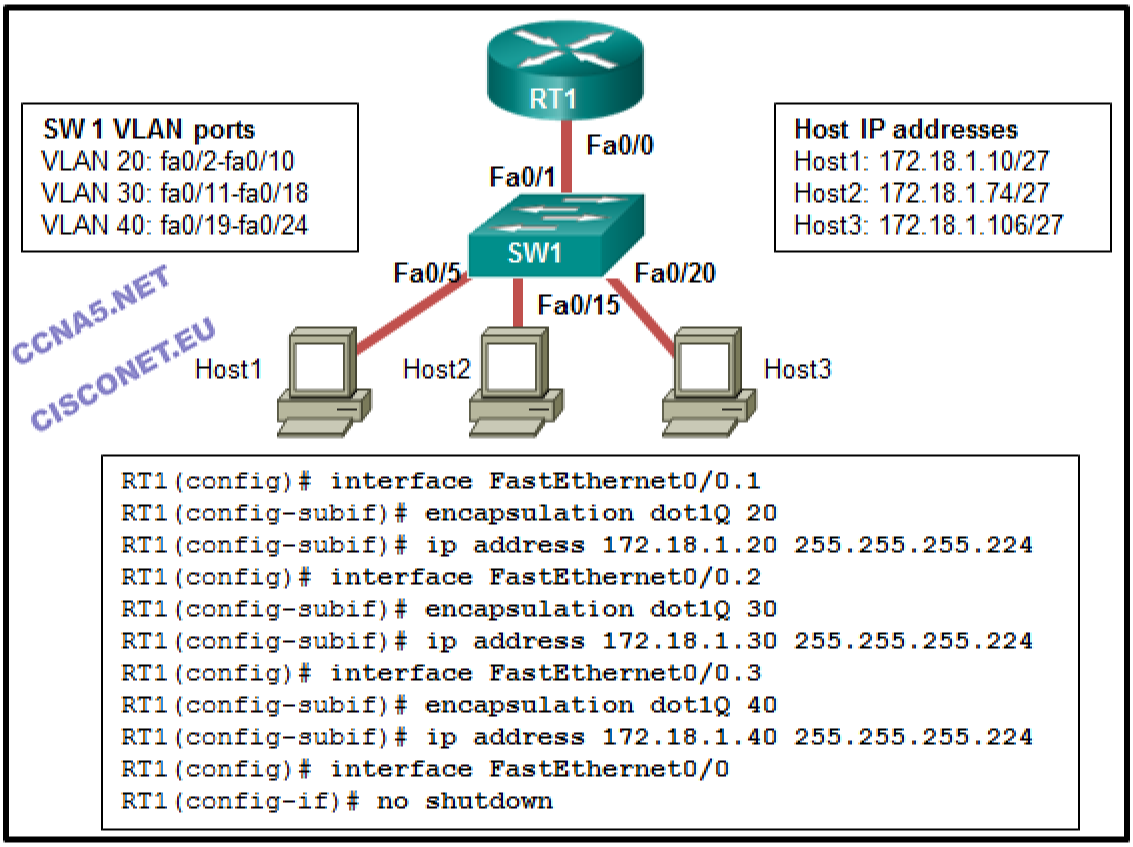
legacy inter-VLAN routing

routing for the management VLAN

router on a stick*

routing via a multilayer switch

10



CCNA5.NET
CISCONET.EU

```
RT1(config)# interface FastEthernet0/0.1
RT1(config-subif)# encapsulation dot1Q 20
RT1(config-subif)# ip address 172.18.1.20 255.255.255.224
RT1(config)# interface FastEthernet0/0.2
RT1(config-subif)# encapsulation dot1Q 30
RT1(config-subif)# ip address 172.18.1.30 255.255.255.224
RT1(config)# interface FastEthernet0/0.3
RT1(config-subif)# encapsulation dot1Q 40
RT1(config-subif)# ip address 172.18.1.40 255.255.255.224
RT1(config)# interface FastEthernet0/0
RT1(config-if)# no shutdown
```

Refer to the exhibit. A network administrator is configuring RT1 for inter-VLAN routing. The switch is configured correctly and is functional. Host1, Host2, and Host3 cannot communicate with each other. Based on the router configuration, what is causing the problem?

Routers do not support 802.1Q encapsulation on subinterfaces.

IP addresses on the subinterfaces are incorrectly matched to the VLANs.*

Each subinterface of Fa0/0 needs separate no shutdown commands.

Interface Fa0/0 is missing IP address configuration information.

11

How is traffic routed between multiple VLANs on a multilayer switch?

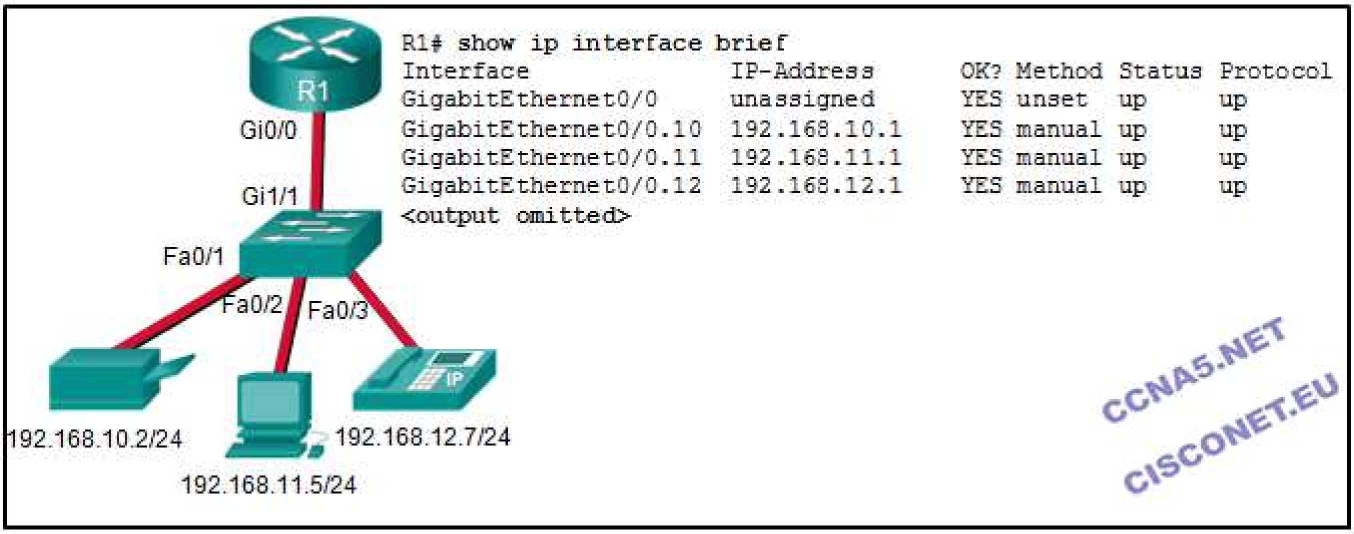
Traffic is routed via internal VLAN interfaces.*

Traffic is routed via physical interfaces.

Traffic is broadcast out all physical interfaces.

Traffic is routed via subinterfaces.

12



```
R1# show ip interface brief
Interface              IP-Address      OK? Method Status  Protocol
GigabitEthernet0/0     unassigned      YES unset  up      up
GigabitEthernet0/0.10  192.168.10.1    YES manual up      up
GigabitEthernet0/0.11  192.168.11.1    YES manual up      up
GigabitEthernet0/0.12  192.168.12.1    YES manual up      up
<output omitted>
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. Communication between the VLANs is not occurring. What could be the issue?

The wrong port on the router has been used.

The Gi1/1 switch port is not in trunking mode.*

Default gateways have not been configured for each VLAN.

A duplex issue exists between the switch and the router.

13

What is a disadvantage of using router-on-a-stick inter-VLAN routing?

does not support VLAN-tagged packets

does not scale well beyond 50 VLANs*

requires the use of multiple router interfaces configured to operate as access links

requires the use of more physical interfaces than legacy inter-VLAN routing

14

Which statement describes a disadvantage of using router subinterfaces for inter-VLAN routing?

Routed traffic must contend for bandwidth on a single router interface.*

All untagged traffic is dropped.

It is more expensive than using individual router interfaces.

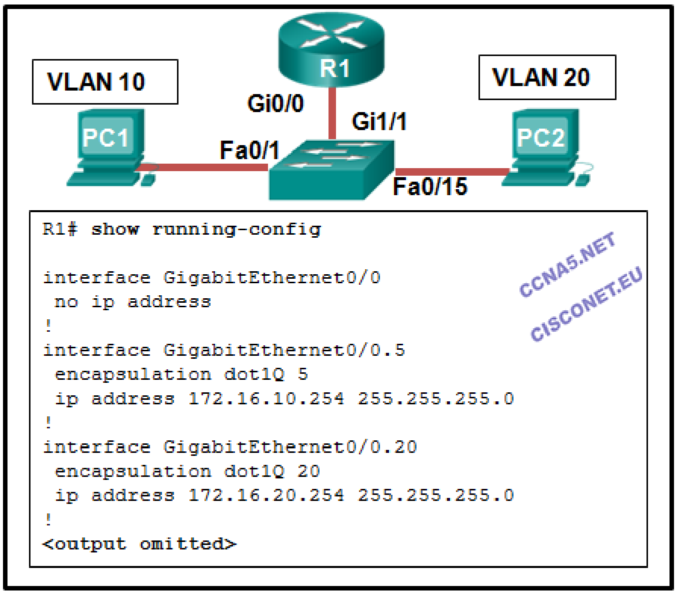
Trunking cannot be used to connect the router to the switch.

15

Fill in the blank with an acronym.

While configuring inter-VLAN routing on a multilayer switch, a/an " **SVI** " is used as a virtual-routed VLAN interface.

16



```
R1# show running-config

interface GigabitEthernet0/0
 no ip address
!
interface GigabitEthernet0/0.5
 encapsulation dot1Q 5
 ip address 172.16.10.254 255.255.255.0
!
interface GigabitEthernet0/0.20
 encapsulation dot1Q 20
 ip address 172.16.20.254 255.255.255.0
!
<output omitted>
```

Refer to the exhibit. A network administrator is verifying the configuration of inter-VLAN routing. Users complain that PC2 cannot communicate with PC1. Based on the output, what is the possible cause of the problem?

The command interface GigabitEthernet0/0.5 was entered incorrectly.

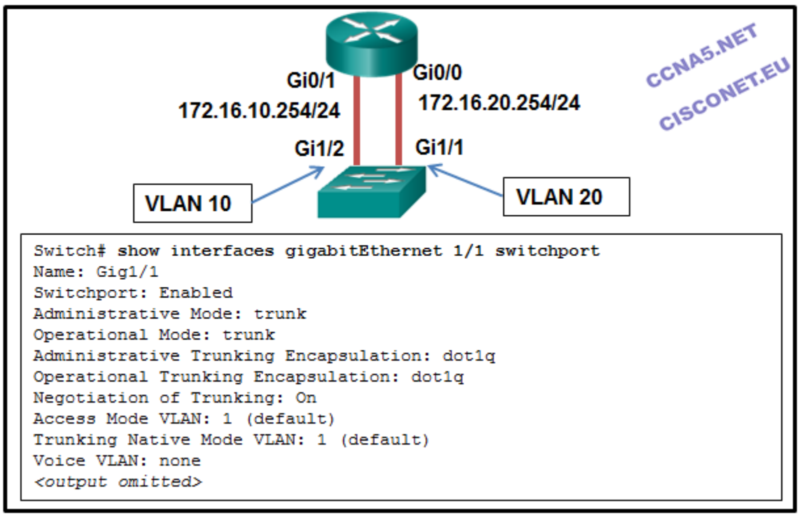
There is no IP address configured on the interface Gi0/0.

The encapsulation dot1Q 5 command contains the wrong VLAN.*

The no shutdown command is not entered on subinterfaces.

Gi0/0 is not configured as a trunk port.

17



```
Switch# show interfaces gigabitEthernet 1/1 switchport
Name: Gig1/1
Switchport: Enabled
Administrative Mode: trunk
Operational Mode: trunk
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: dot1q
Negotiation of Trunking: On
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Voice VLAN: none
<output omitted>
```

Refer to the exhibit. A network administrator is verifying the configuration of inter-VLAN routing. Users complain that PCs on different VLANs cannot communicate. Based on the output, what are two configuration errors on switch interface Gi1/1? (Choose two.)

The trunking encapsulation protocol is configured wrong.

Negotiation of trunking is turned on on Gi1/1.

Gi1/1 is configured as trunk mode.*

Voice VLAN is not assigned to Gi1/1.

Gi1/1 is in the default VLAN.*

18

While configuring inter-VLAN routing on a multilayer switch, a network administrator issues the no switchport command on an interface that is connected to another switch. What is the purpose of this command?

to create a switched virtual interface
to provide an access link that tags VLAN traffic
to create a routed port for a single network*
to provide a static trunk link

19

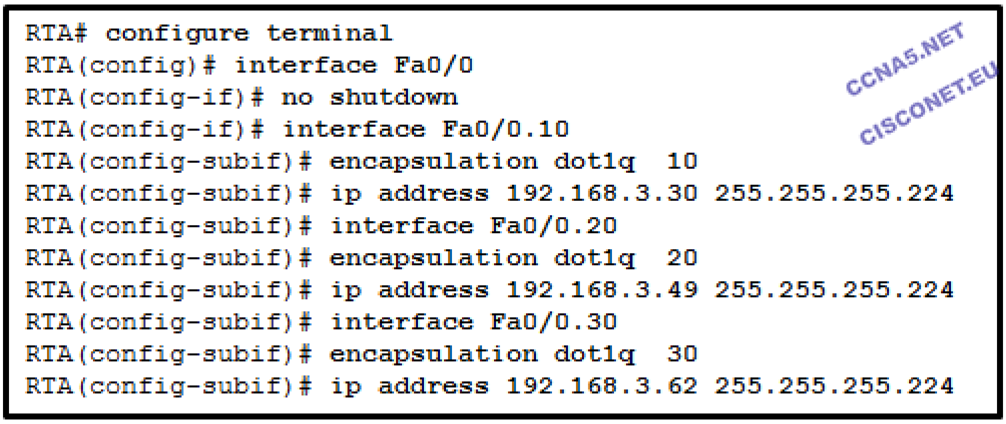
The PT initialization was skipped. You will not be able to view the PT activity.
Open the PT Activity. Perform the tasks in the activity instructions and then answer the question.
Fill in the blank. Do not use abbreviations.
Which command is missing on the Layer 3 switch to restore the full connectivity between PC1 and the web server?
“ **ip address 192.168.20.1 255.255.255.0** ”

20

A small college uses VLAN 10 for the classroom network and VLAN 20 for the office network. What is needed to enable communication between these two VLANs while using legacy inter-VLAN routing?

A switch with a port that is configured as trunk is needed to connect to a router.
Two groups of switches are needed, each with ports that are configured for one VLAN.
A router with at least two LAN interfaces should be used.*
A router with one VLAN interface is needed to connect to the SVI on a switch.

21



```
RTA# configure terminal
RTA(config)# interface Fa0/0
RTA(config-if)# no shutdown
RTA(config-if)# interface Fa0/0.10
RTA(config-subif)# encapsulation dot1q  10
RTA(config-subif)# ip address 192.168.3.30 255.255.255.224
RTA(config-subif)# interface Fa0/0.20
RTA(config-subif)# encapsulation dot1q  20
RTA(config-subif)# ip address 192.168.3.49 255.255.255.224
RTA(config-subif)# interface Fa0/0.30
RTA(config-subif)# encapsulation dot1q  30
RTA(config-subif)# ip address 192.168.3.62 255.255.255.224
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. After attempting to enter the configuration that is shown in router RTA, an administrator receives an error and users on VLAN 20 report that they are unable to reach users on VLAN 30. What is causing the problem?

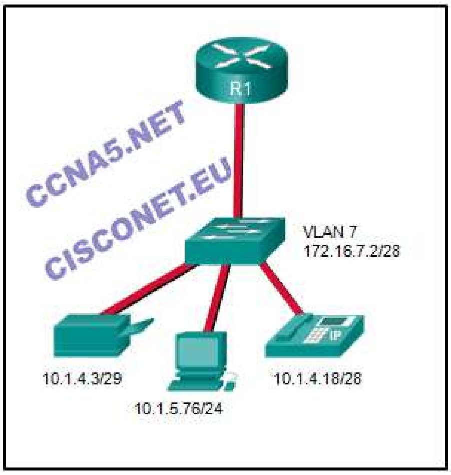
The no shutdown command should have been issued on Fa0/0.20 and Fa0/0.30.

There is no address on Fa0/0 to use as a default gateway.

Dot1q does not support subinterfaces.

RTA is using the same subnet for VLAN 20 and VLAN 30.*

22



Refer to the exhibit. A network administrator needs to configure router-on-a-stick for the networks that are shown. How many subinterfaces will have to be created on the router if each VLAN that is shown is to be routed and each VLAN has its own subinterface?

5

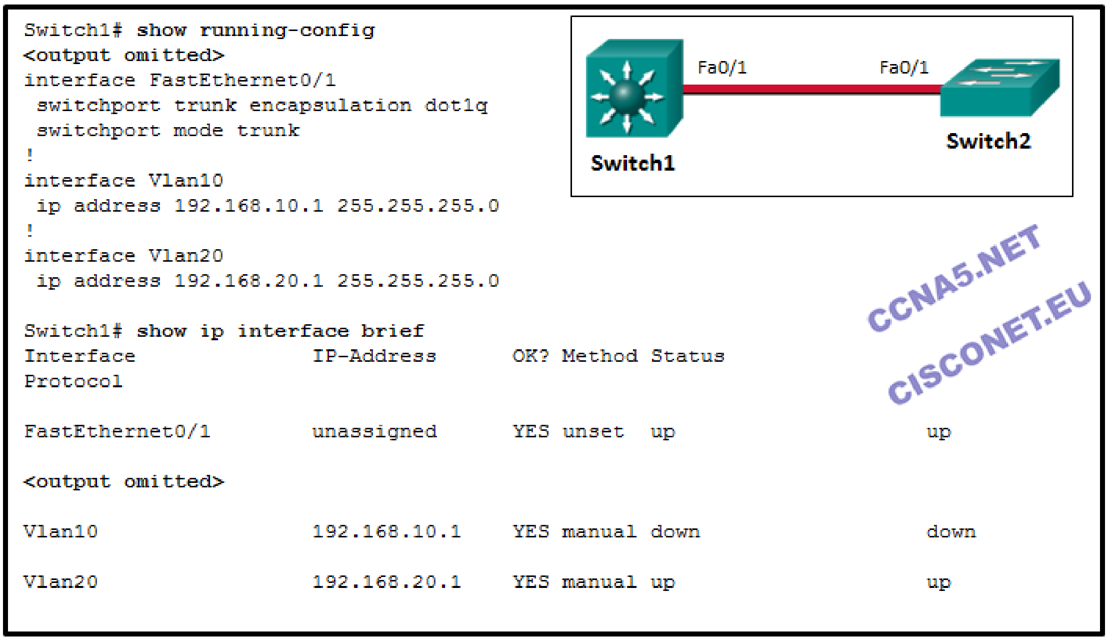
3

1

4*

2

23



```
Switch1# show running-config
<output omitted>
interface FastEthernet0/1
 switchport trunk encapsulation dot1q
 switchport mode trunk
!
interface Vlan10
 ip address 192.168.10.1 255.255.255.0
!
interface Vlan20
 ip address 192.168.20.1 255.255.255.0

Switch1# show ip interface brief
Interface              IP-Address      OK? Method Status
Protocol

FastEthernet0/1        unassigned      YES unset  up                    up

<output omitted>

Vlan10                 192.168.10.1    YES manual down                  down

Vlan20                 192.168.20.1    YES manual up                    up
```

Refer to the exhibit. Which command can the administrator issue to change the VLAN10 status to up?

```
Switch1(config)# vlan 10*
```

```
Switch1(config)# interface vlan 10
Switch1(config-if)# ip address 192.168.10.1 255.255.255.0
```

```
Switch1(config)# interface vlan 10
Switch1(config-if)# ip address 192.168.10.1 255.255.255.0
Switch1(config-if)# no shutdown
```

```
Switch1(config)# interface vlan 10
Switch1(config-if)# no shutdown
```

CCNA 2 Chapter 6 v5.0 Exam Answers 2013

1

What are two advantages of static routing over dynamic routing? (Choose two.)

Static routing is more secure because it does not advertise over the network.*

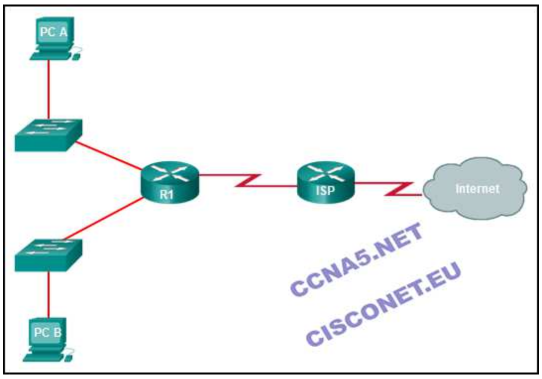
Static routing is relatively easy to configure for large networks.

Static routing requires very little knowledge of the network for correct implementation.

Static routing uses fewer router resources than dynamic routing.*

Static routing scales well with expanding networks.

2



CCNA5.NET
CISCONET.EU

Refer to the exhibit. Which is the best way for PC A and PC B to successfully communicate with sites on the Internet?

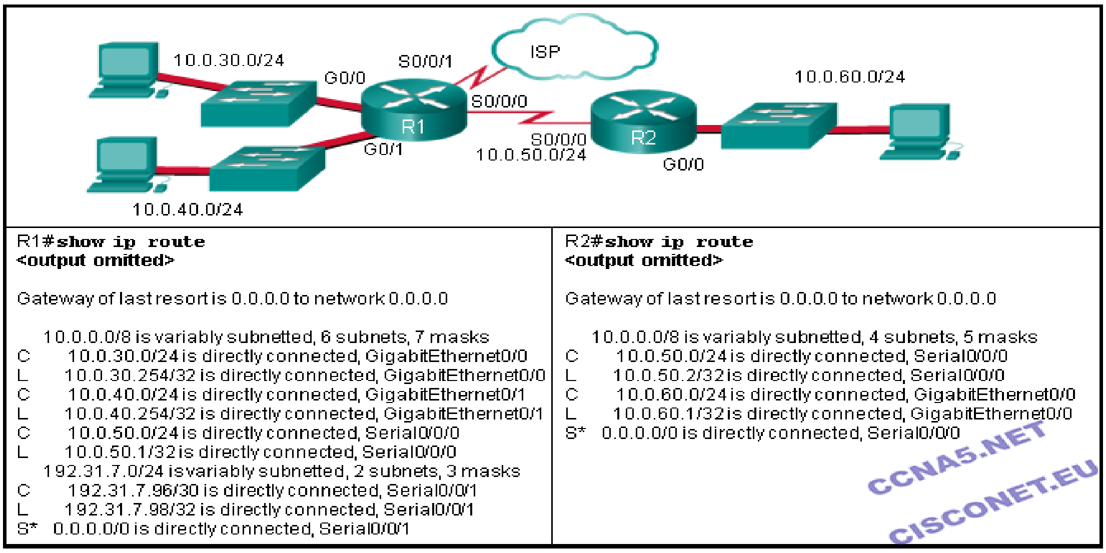
Configure a default route from R1 to ISP and a static route from ISP to R1.*

Configure a static route from R1 to ISP and a dynamic route from ISP to R1.

Configure a routing protocol between R1 and ISP and advertise all the routes.

Configure a dynamic route from R1 to ISP and a static route from ISP to R1.

3



CCNA5.NET
CISCONET.EU

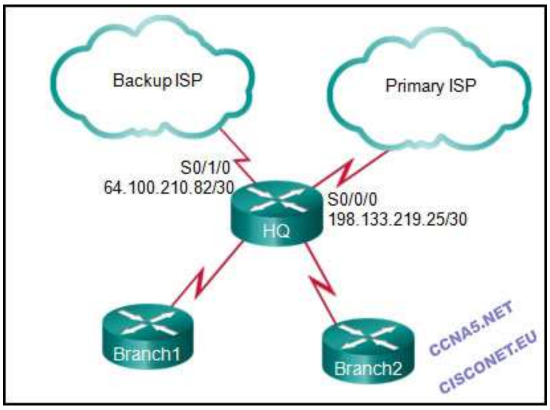
```
R1#show ip route
<output omitted>

Gateway of last resort is 0.0.0.0 to network 0.0.0.0

     10.0.0.0/8 is variably subnetted, 6 subnets, 7 masks
C       10.0.30.0/24 is directly connected, GigabitEthernet0/0
L       10.0.30.254/32 is directly connected, GigabitEthernet0/0
C       10.0.40.0/24 is directly connected, GigabitEthernet0/1
L       10.0.40.254/32 is directly connected, GigabitEthernet0/1
C       10.0.50.0/24 is directly connected, Serial0/0/0
L       10.0.50.1/32 is directly connected, Serial0/0/0
     192.31.7.0/24 isvariably subnetted, 2 subnets, 3 masks
C       192.31.7.96/30 is directly connected, Serial0/0/1
L       192.31.7.98/32 is directly connected, Serial0/0/1
S*   0.0.0.0/0 is directly connected, Serial0/0/1
```

```
R2#show ip route
<output omitted>

Gateway of last resort is 0.0.0.0 to network 0.0.0.0

     10.0.0.0/8 is variably subnetted, 4 subnets, 5 masks
C       10.0.50.0/24 is directly connected, Serial0/0/0
L       10.0.50.2/32 is directly connected, Serial0/0/0
C       10.0.60.0/24 is directly connected, GigabitEthernet0/0
L       10.0.60.1/32 is directly connected, GigabitEthernet0/0
S*   0.0.0.0/0 is directly connected, Serial0/0/0
```

Refer to the exhibit. The small company shown uses static routing. Users on the R2 LAN have reported a problem with connectivity. What is the issue?

R1 and R2 must use a dynamic routing protocol.
R1 needs a default route to R2.
R2 needs a static route to the Internet.
R2 needs a static route to the R1 LANs.
R1 needs a static route to the R2 LAN.*

4



Refer to the exhibit. The network engineer for the company that is shown wants to use the primary ISP connection for all external connectivity. The backup ISP connection is used only if the primary ISP connection fails. Which set of commands would accomplish this goal?

ip route 198.133.219.24 255.255.255.252
ip route 64.100.210.80 255.255.255.252

ip route 198.133.219.24 255.255.255.252
ip route 64.100.210.80 255.255.255.252 10

ip route 0.0.0.0 0.0.0.0 s0/0/0
ip route 0.0.0.0 0.0.0.0 s0/1/0

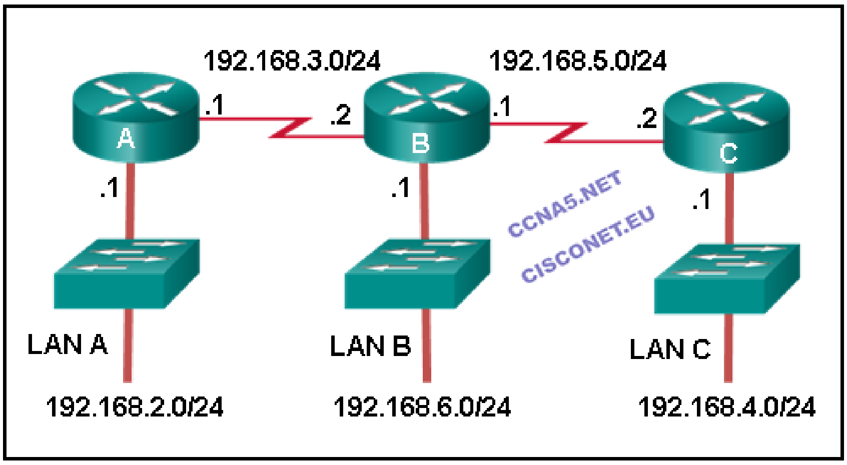
ip route 0.0.0.0 0.0.0.0 s0/0/0
ip route 0.0.0.0 0.0.0.0 s0/1/0 10 ****

5

What type of route allows a router to forward packets even though its routing table contains no specific route to the destination network?

generic route
destination route
dynamic route
default route*

6



Refer to the graphic. Which command would be used on router A to configure a static route to direct traffic from LAN A that is destined for LAN C?

A(config)# ip route 192.168.3.2 255.255.255.0 192.168.4.0

A(config)# ip route 192.168.5.0 255.255.255.0 192.168.3.2

A(config)# ip route 192.168.3.0 255.255.255.0 192.168.3.1

A(config)# ip route 192.168.4.0 255.255.255.0 192.168.3.2*

A(config)# ip route 192.168.4.0 255.255.255.0 192.168.5.2

7

The network administrator configures the router with the ip route 172.16.1.0 255.255.255.0 172.16.2.2 command. How will this route appear in the routing table?

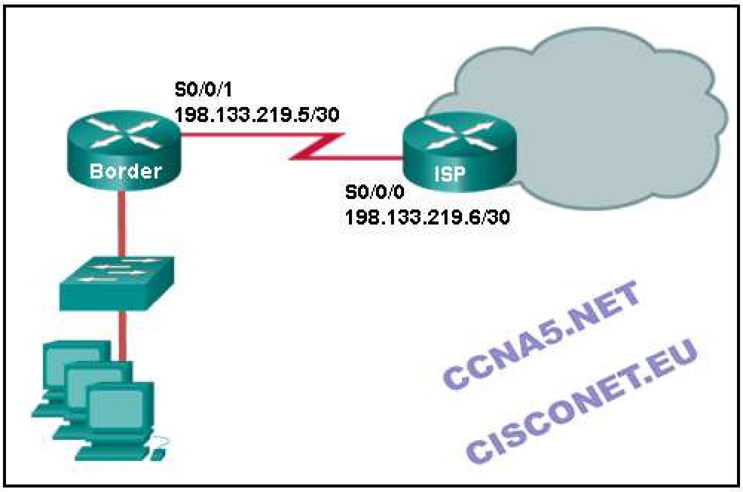
S 172.16.1.0 is directly connected, Serial0/0

S 172.16.1.0 [1/0] via 172.16.2.2*

C 172.16.1.0 [1/0] via 172.16.2.2

C 172.16.1.0 is directly connected, Serial0/0

8



Refer to the exhibit. The network administrator needs to configure a default route on the Border router. Which command would the administrator use to configure a default route that will require the least amount of router processing when forwarding packets?

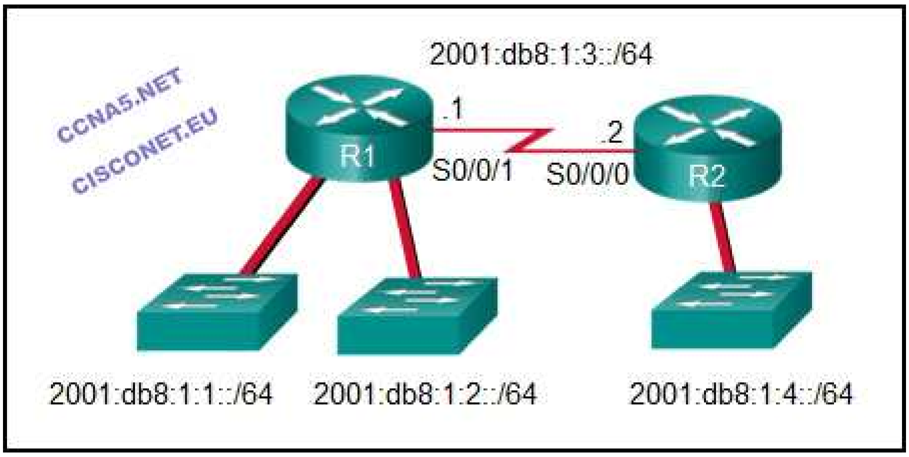
Border(config)# ip route 0.0.0.0 0.0.0.0 s0/0/1*
Border(config)# ip route 0.0.0.0 0.0.0.0 198.133.219.5
Border(config)# ip route 0.0.0.0 0.0.0.0 s0/0/0
Border(config)# ip route 0.0.0.0 0.0.0.0 198.133.219.6

9

Why would a floating static route be configured with an administrative distance that is higher than the administrative distance of a dynamic routing protocol that is running on the same router?

to be the priority route in the routing table
to be used as a backup route*
to act as a gateway of last resort
to load-balance the traffic

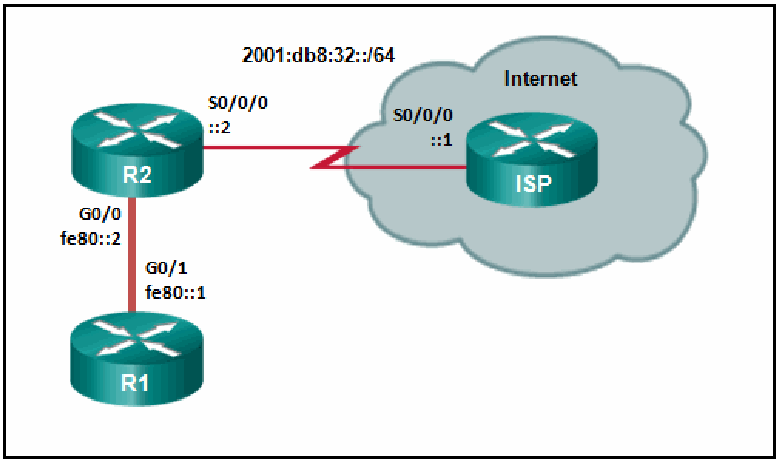
10



Refer to the exhibit. What command would be used to configure a static route on R1 so that traffic from both LANs can reach the 2001:db8:1:4::/64 remote network?

ipv6 route 2001:db8:1::/65 2001:db8:1:3::1
ipv6 route 2001:db8:1:4::/64 2001:db8:1:3::2*
ipv6 route 2001:db8:1:4::/64 2001:db8:1:3::1
ipv6 route ::/0 serial0/0/0

11



Refer to the exhibit. Which default static route command would allow R1 to potentially reach all unknown networks on the Internet?

R1(config)# ipv6 route 2001:db8:32::/64 G0/1 fe80::2
R1(config)# ipv6 route ::/0 G0/0 fe80::2
R1(config)# ipv6 route ::/0 G0/1 fe80::2*
R1(config)# ipv6 route 2001:db8:32::/64 G0/0

12
Which two statements describe classful IP addresses? (Choose two.)

All subnets in a network are the same size.*
Only Class A addresses can be represented by high-order bits 100.
Three of the five classes of addresses are reserved for multicasts and experimental use.
The number of bits used to identify the hosts is fixed by the class of the network.*
Up to 24 bits can make up the host portion of a Class C address.
It is possible to determine which class an address belongs to by reading the first bit.

13
A company has several networks with the following IP address requirements:
IP phones – 50
PCs – 70
IP cameras – 10
wireless access points – 10
network printers – 10
network scanners – 2

Which block of addresses would be the minimum to accommodate all of these devices if each type of device was on its own network?

172.16.0.0/23
172.16.0.0/24*
172.16.0.0/22
172.16.0.0/25

14

What does VLSM allow a network administrator to do?

utilize one public IP address to translate multiple private addresses

utilize multiple different subnet masks in the same IP address space*

utilize one dynamic routing protocol throughout the entire network

utilize multiple routing protocols within an autonomous system

utilize one subnet mask throughout a hierarchical network

15

What would be the best summary route for the following networks?

10.50.168.0/23

10.50.170.0/23

10.50.172.0/23

10.50.174.0/24

10.50.160.0/22

10.50.164.0/23

10.50.168.0/16

10.50.168.0/21*

10.50.168.0/22

10.50.168.0/23

16

What is a valid summary route for IPv6 networks 2001:0DB8:ACAD:4::/64, 2001:0DB8:ACAD:5::/64, 2001:0DB8:ACAD:6::/64, and 2001:0DB8:ACAD:7::/64?

2001:0DB8:ACAD:0000::/63

2001:0DB8:ACAD:0000::/64

2001:0DB8:ACAD:0004::/62*

2001:0DB8:ACAD:0004::/63

17

Which type of static route that is configured on a router uses only the exit interface?

directly connected static route*

fully specified static route

default static route

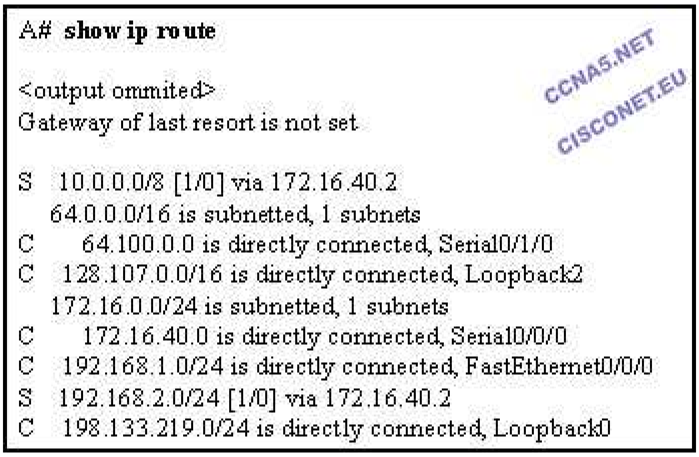
recursive static route

18

Which three IOS troubleshooting commands can help to isolate problems with a static route? (Choose three.)

show ip route*
show ip interface brief*
ping*
tracert
show arp
show version

19



```
A# show ip route

<output ommited>
Gateway of last resort is not set

S    10.0.0.0/8 [1/0] via 172.16.40.2
     64.0.0.0/16 is subnetted, 1 subnets
C       64.100.0.0 is directly connected, Serial0/1/0
C    128.107.0.0/16 is directly connected, Loopback2
     172.16.0.0/24 is subnetted, 1 subnets
C       172.16.40.0 is directly connected, Serial0/0/0
C    192.168.1.0/24 is directly connected, FastEthernet0/0/0
S    192.168.2.0/24 [1/0] via 172.16.40.2
C    198.133.219.0/24 is directly connected, Loopback0
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. What two commands will change the next-hop address for the 10.0.0.0/8 network from 172.16.40.2 to 192.168.1.2? (Choose two.)

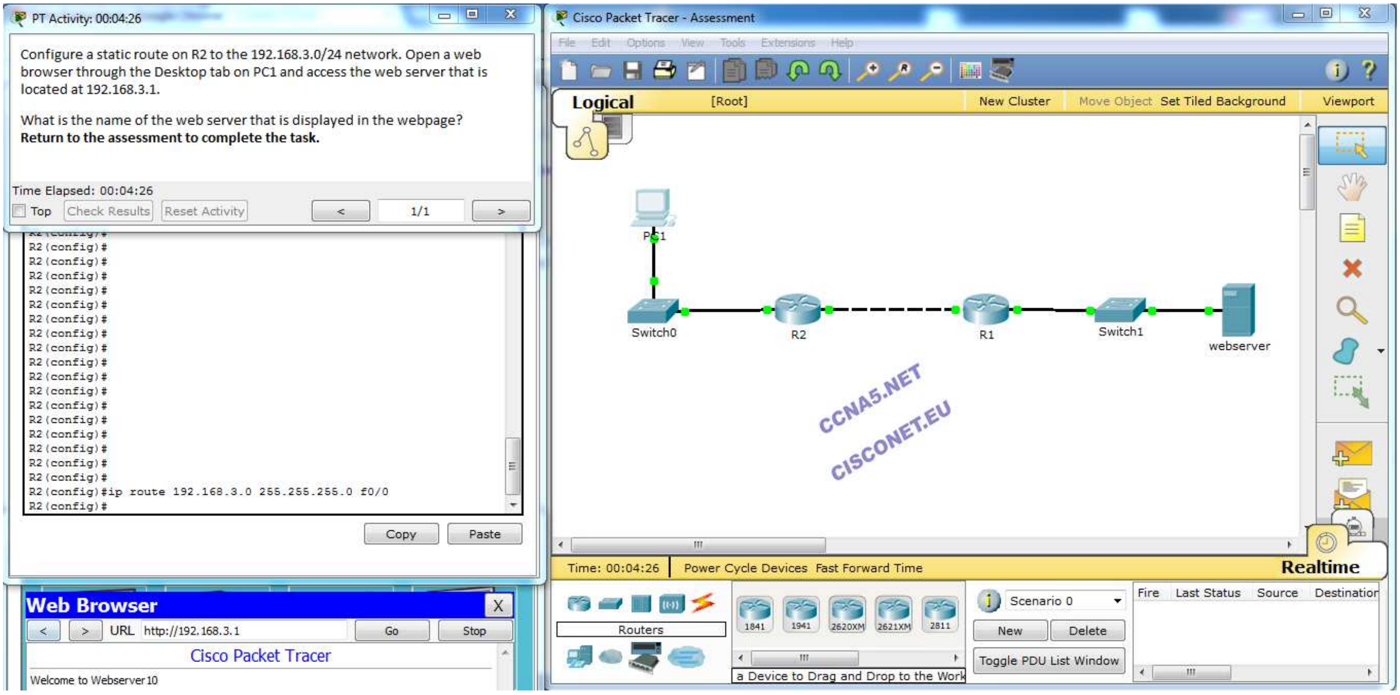
A(config)# ip route 10.0.0.0 255.0.0.0 192.168.1.2*
A(config)# ip route 10.0.0.0 255.0.0.0 s0/0/0
A(config)# no ip address 10.0.0.1 255.0.0.0 172.16.40.2
A(config)# no network 10.0.0.0 255.0.0.0 172.16.40.2
A(config)# no ip route 10.0.0.0 255.0.0.0 172.16.40.2*

20

What happens to a static route entry in a routing table when the outgoing interface is not available?

The router polls neighbors for a replacement route.
The router redirects the static route to compensate for the loss of the next hop device.
The route is removed from the table.*
The route remains in the table because it was defined as static.

21



PT Activity: 00:04:26

Configure a static route on R2 to the 192.168.3.0/24 network. Open a web browser through the Desktop tab on PC1 and access the web server that is located at 192.168.3.1.

What is the name of the web server that is displayed in the webpage?
Return to the assessment to complete the task.

Time Elapsed: 00:04:26

```
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#
R2(config)#ip route 192.168.3.0 255.255.255.0 f0/0
R2(config)#
```

Web Browser
URL http://192.168.3.1
Cisco Packet Tracer
Welcome to Webserver10

Launch PT Hide and Save PT

Open the PT activity. Perform the tasks in the activity instructions and then answer the question. What is the name of the web server that is displayed in the webpage?

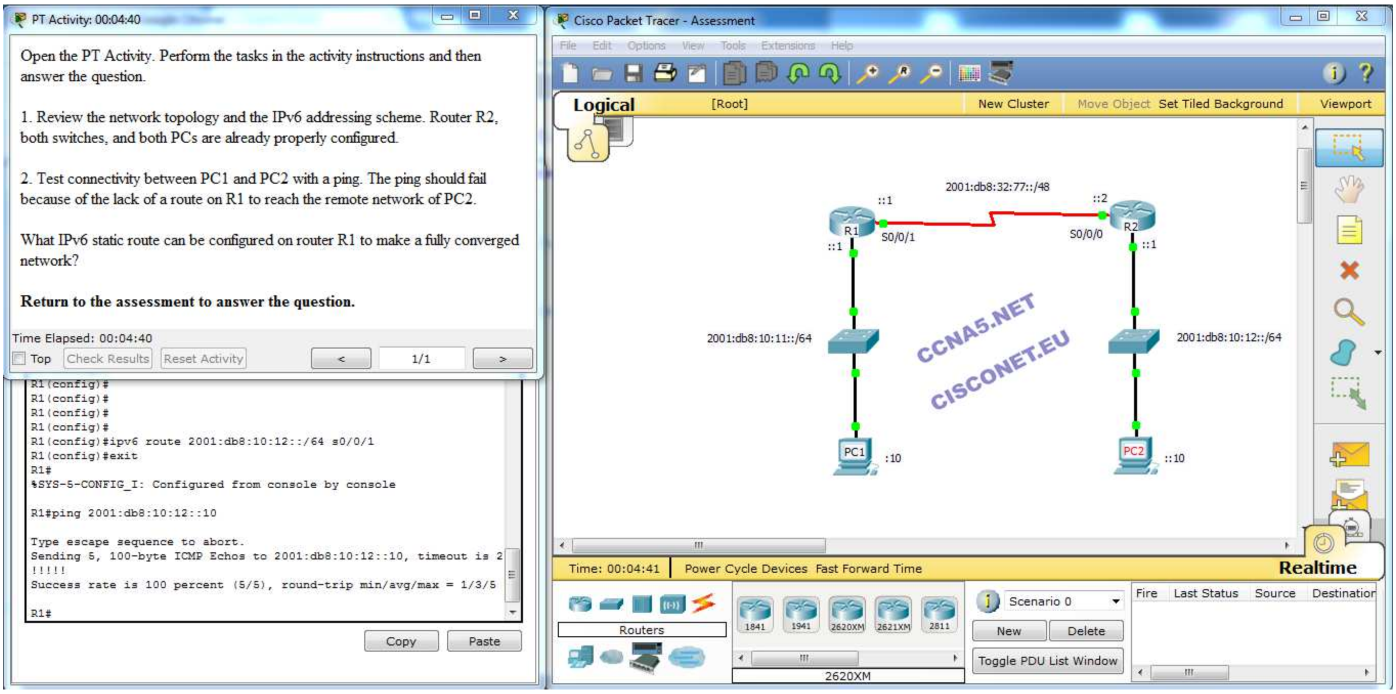
Webserver10*

Main-Webserver

WWW-Server

MNSRV

22



PT Activity: 00:04:40

Open the PT Activity. Perform the tasks in the activity instructions and then answer the question.

1. Review the network topology and the IPv6 addressing scheme. Router R2, both switches, and both PCs are already properly configured.

2. Test connectivity between PC1 and PC2 with a ping. The ping should fail because of the lack of a route on R1 to reach the remote network of PC2.

What IPv6 static route can be configured on router R1 to make a fully converged network?

Return to the assessment to answer the question.

Time Elapsed: 00:04:40

```
R1(config)#
R1(config)#
R1(config)#
R1(config)#
R1(config)#ipv6 route 2001:db8:10:12::/64 s0/0/1
R1(config)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#ping 2001:db8:10:12::10

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:db8:10:12::10, timeout is 2
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/3/5

R1#
```

Launch PT Hide and Save PT

Open the PT Activity. Perform the tasks in the activity instructions and then answer the question.

What IPv6 static route can be configured on router R1 to make a fully converged network?

ipv6 route 2001:db8:10:12::/64 S0/0/1*

ipv6 route 2001:db8:10:12::/64 2001:db8:32:77::1

ipv6 route 2001:db8:10:12::/64 S0/0/0

ipv6 route 2001:db8:10:12::/64 2001:db8:10:12::1

CCNA 2 v5.0 Routing Protocols Chapter 7

1

A network administrator has just changed the router ID on a router that is working in an OSPFv2 environment. What should the administrator do to reset the adjacencies and use the new router ID?

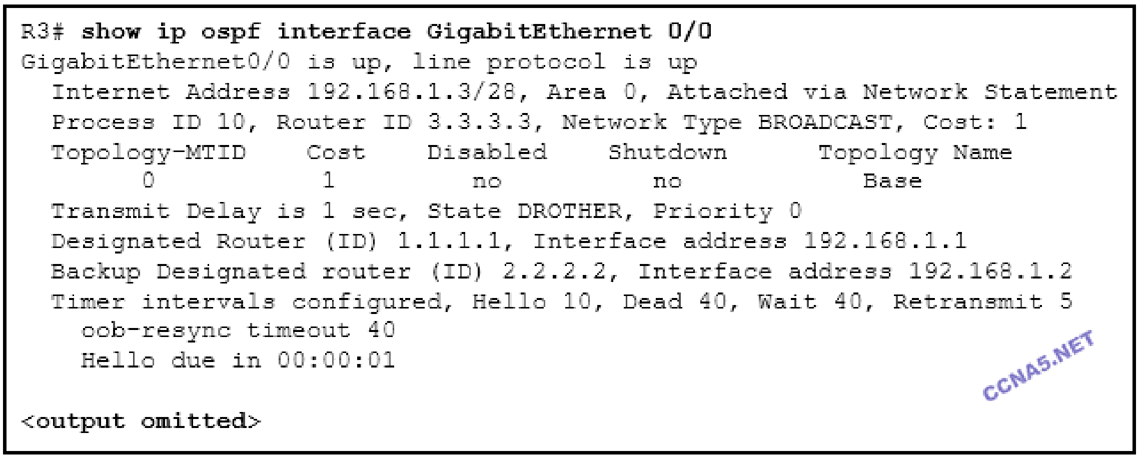
Issue the clear ip ospf process privileged mode command.*

Configure the network statements.

Change the OSPFv2 process ID.

Change the interface priority.

2



```
R3# show ip ospf interface GigabitEthernet 0/0
GigabitEthernet0/0 is up, line protocol is up
  Internet Address 192.168.1.3/28, Area 0, Attached via Network Statement
  Process ID 10, Router ID 3.3.3.3, Network Type BROADCAST, Cost: 1
  Topology-MTID    Cost    Disabled    Shutdown      Topology Name
        0           1         no          no             Base
  Transmit Delay is 1 sec, State DROTHER, Priority 0
  Designated Router (ID) 1.1.1.1, Interface address 192.168.1.1
  Backup Designated router (ID) 2.2.2.2, Interface address 192.168.1.2
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    oob-resync timeout 40
    Hello due in 00:00:01

<output omitted>
```

CCNA5.NET

Refer to the exhibit. What three conclusions can be drawn from the displayed output? (Choose three.)

The DR can be reached through the GigabitEthernet 0/0 interface.*

There have been 9 seconds since the last hello packet sent.*

The router ID on the DR router is 3.3.3.3

The BDR has three neighbors.

The router ID values were not the criteria used to select the DR and the BDR.*

This interface is using the default priority.

3

When checking a routing table, a network technician notices the following entry:

O*E2 0.0.0.0/0 [110/1] via 192.168.16.3, 00:20:22, Serial0/0/0

What information can be gathered from this output?

This route is a propagated default route.*

The edge of the OSPF area 0 is the interface that is addressed 192.168.16.3.

The route is located two hops away.

The metric for this route is 110.

4

Which command will a network engineer issue to verify the configured hello and dead timer intervals on a point-to-point WAN link between two routers that are running OSPFv2?

show ipv6 ospf interface serial 0/0/0

show ip ospf neighbor

show ip ospf interface serial 0/0/0*

show ip ospf interface fastethernet 0/1

5

A network engineer has manually configured the hello interval to 15 seconds on an interface of a router that is running OSPFv2. By default, how will the dead interval on the interface be affected?

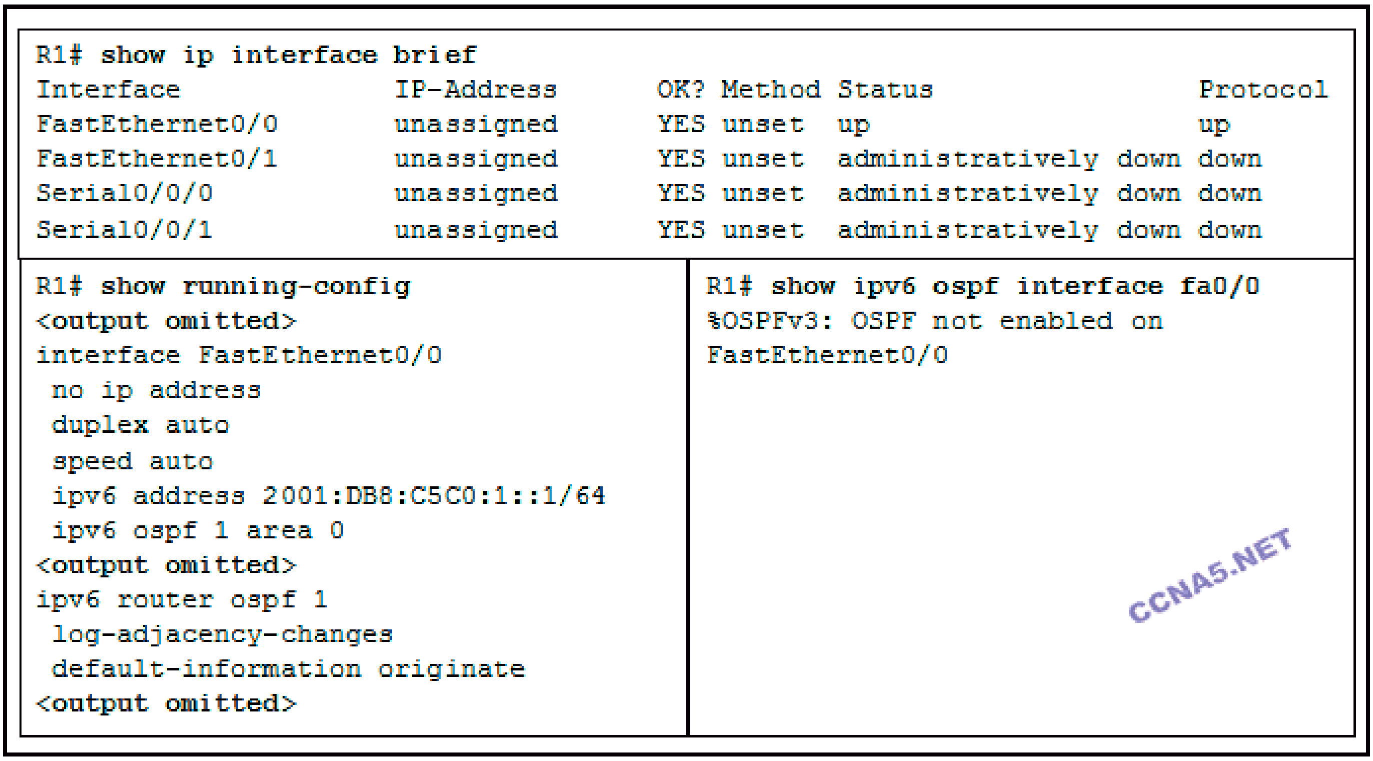
The dead interval will not change from the default value.

The dead interval will now be 30 seconds.

The dead interval will now be 15 seconds.

The dead interval will now be 60 seconds.*

6



```
R1# show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        unassigned      YES unset  up                    up
FastEthernet0/1        unassigned      YES unset  administratively down down
Serial0/0/0            unassigned      YES unset  administratively down down
Serial0/0/1            unassigned      YES unset  administratively down down
```

```
R1# show running-config
<output omitted>
interface FastEthernet0/0
 no ip address
 duplex auto
 speed auto
 ipv6 address 2001:DB8:C5C0:1::1/64
 ipv6 ospf 1 area 0
<output omitted>
ipv6 router ospf 1
 log-adjacency-changes
 default-information originate
<output omitted>
```

```
R1# show ipv6 ospf interface fa0/0
%OSPFv3: OSPF not enabled on
FastEthernet0/0
```

Refer to the exhibit. An administrator is trying to configure R1 to run OSPFv3 but the neighbor adjacency is not forming with the router connected to Fa0/0. What is the cause of the problem?

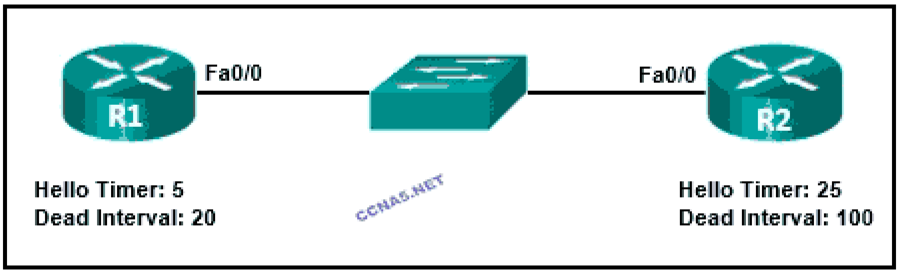
FastEthernet0/0 has been configured as a passive interface.

No router ID has been configured.*

A link-local address has not been configured on interface FastEthernet0/0.

The OSPF process ID and area values are backwards in the interface configuration.

7



Refer to the exhibit. A network administrator has configured the OSPF timers to the values that are shown in the graphic. What is the result of having those manually configured timers?

The R1 dead timer expires between hello packets from R2.*

The neighbor adjacency has formed.

R1 automatically adjusts its own timers to match the R2 timers.

The hello timer on R2 expires every ten seconds.

8

When OSPFv2 neighbors are establishing adjacencies, in which state do they elect a DR and BDR router?

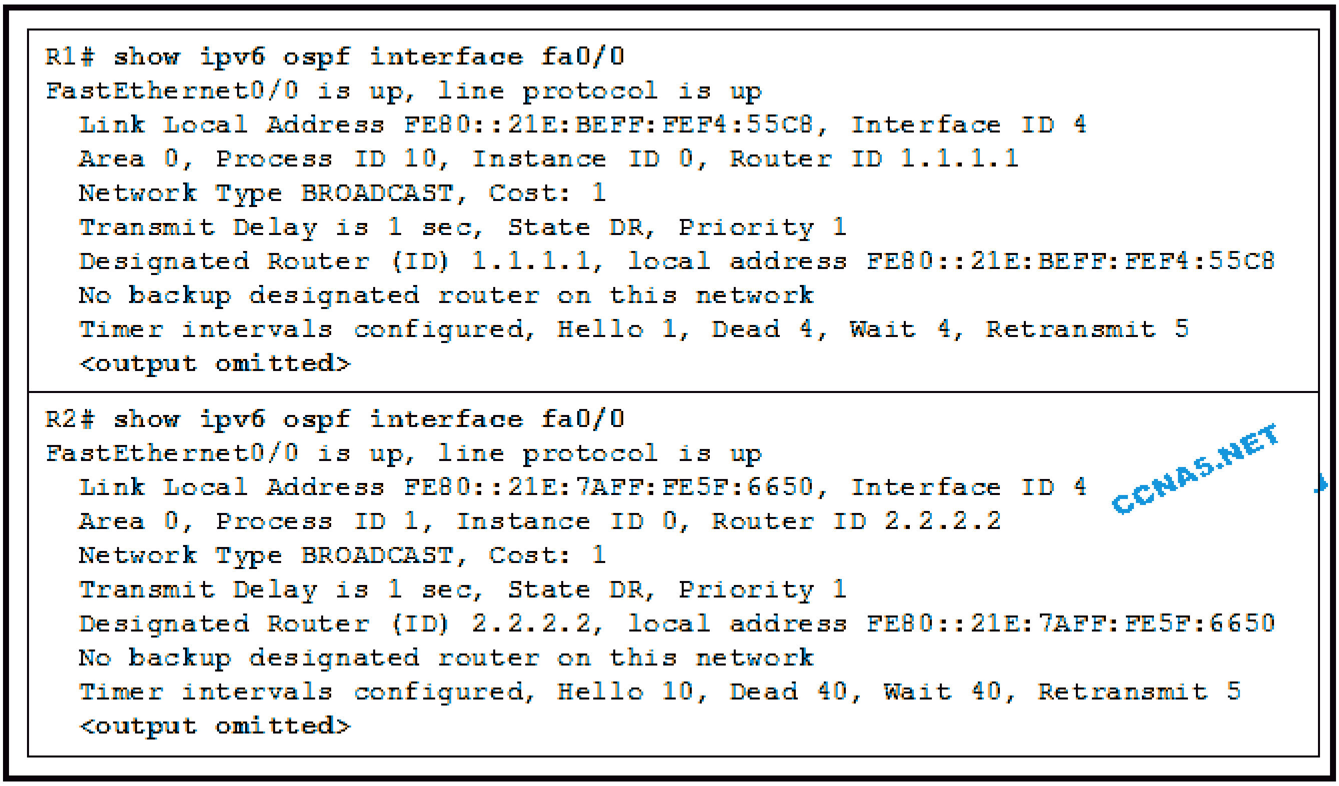
Two-Way state*

Loading state

Init state

Exchange state

9



```
R1# show ipv6 ospf interface fa0/0
FastEthernet0/0 is up, line protocol is up
  Link Local Address FE80::21E:BEFF:FEF4:55C8, Interface ID 4
  Area 0, Process ID 10, Instance ID 0, Router ID 1.1.1.1
  Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 1.1.1.1, local address FE80::21E:BEFF:FEF4:55C8
  No backup designated router on this network
  Timer intervals configured, Hello 1, Dead 4, Wait 4, Retransmit 5
  <output omitted>
```

```
R2# show ipv6 ospf interface fa0/0
FastEthernet0/0 is up, line protocol is up
  Link Local Address FE80::21E:7AFF:FE5F:6650, Interface ID 4
  Area 0, Process ID 1, Instance ID 0, Router ID 2.2.2.2
  Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 2.2.2.2, local address FE80::21E:7AFF:FE5F:6650
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  <output omitted>
```

Refer to the exhibit. R1 and R2 are connected to the same LAN segment and are configured to run OSPFv3. They are not forming a neighbor adjacency. What is the cause of the problem?

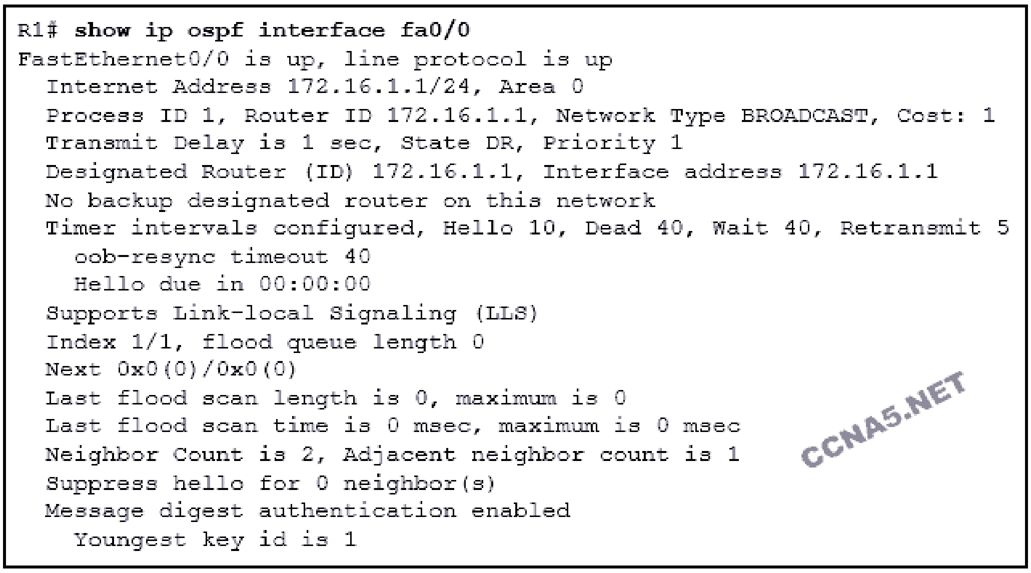
The OSPFv3 process IDs of R1 and R2 are different.

The priority value of both R1 and R2 is 1.

The timer intervals of R1 and R2 do not match.*

The IPv6 addresses of R1 and R2 are not in the same subnet.

10



```
R1# show ip ospf interface fa0/0
FastEthernet0/0 is up, line protocol is up
  Internet Address 172.16.1.1/24, Area 0
  Process ID 1, Router ID 172.16.1.1, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 172.16.1.1, Interface address 172.16.1.1
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    oob-resync timeout 40
    Hello due in 00:00:00
  Supports Link-local Signaling (LLS)
  Index 1/1, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 0, maximum is 0
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 2, Adjacent neighbor count is 1
  Suppress hello for 0 neighbor(s)
  Message digest authentication enabled
    Youngest key id is 1
```

CCNA5.NET

Refer to the exhibit. What kind of OSPF authentication has been configured on this interface?

null

simple

MD5*

plain text

11

Why is MD5 authentication more secure than simple authentication for OSPF updates?

MD5 does not send the password to the neighbor router.*

MD5 requires passwords that are at least 8 characters long.

MD5 uses both a username and a password to authenticate the neighbor.

MD5 employs IPsec to keep the updates from being intercepted.

12

Which two pieces of information are used by the OSPF MD5 algorithm to generate a signature? (Choose two.)

OSPF router ID

secret key*

router hostname

interface IP address

OSPF message*

13

A network engineer is troubleshooting convergence and adjacency issues in an OSPFv2 network and has noted that some expected network route entries are not displayed in the routing table. Which two commands will provide additional information about the state of router adjacencies, timer intervals, and the area ID? (Choose two.)

show running-configuration

show ip ospf neighbor*

show ip ospf interface*

show ip route ospf

show ip protocols

14

Why do OSPF serial interfaces usually require manual bandwidth configuration?

OSPF uses the bandwidth value to compute routes for its routing table.*

All serial interfaces default to a value of 1.544 Mb/s.

Each side of an OSPF serial link should be configured with a unique value.

Bandwidth value affects the actual speed of the link.

15

A network engineer is troubleshooting an OSPFv2 network and discovers that two routers connected by a point-to-point WAN serial link are not establishing an adjacency. The OSPF routing process, network commands and area ID are all confirmed as correct, and the interfaces are not passive. Testing shows that the cabling is correct, that the link is up, and pings between the interfaces are successful. What is most likely the problem?

A clock rate has not been set on the DCE interface of the serial link.

The OSPFv2 process IDs on each router do not match.

A DR election has not taken place.

The subnet masks on the two connected serial interfaces do not match.*

16

A network engineer is troubleshooting OSPFv2 routing issues on two connected routers. Which two requirements to form an adjacency need to be verified? (Choose two.)

Verify that the interfaces that connect the two routers are in the same area.*

Verify that one of the routers is the DR or BDR and the other router a DRother.

Verify that one of the interfaces that connects the two routers is active and the other passive.

Verify that the interfaces that connect the two routers are in the same subnet.*

Verify that both routers are using the same OSPFv2 process ID.

17

Which command is used to verify that OSPF is enabled and also provides a list of the networks that are being advertised by the network?

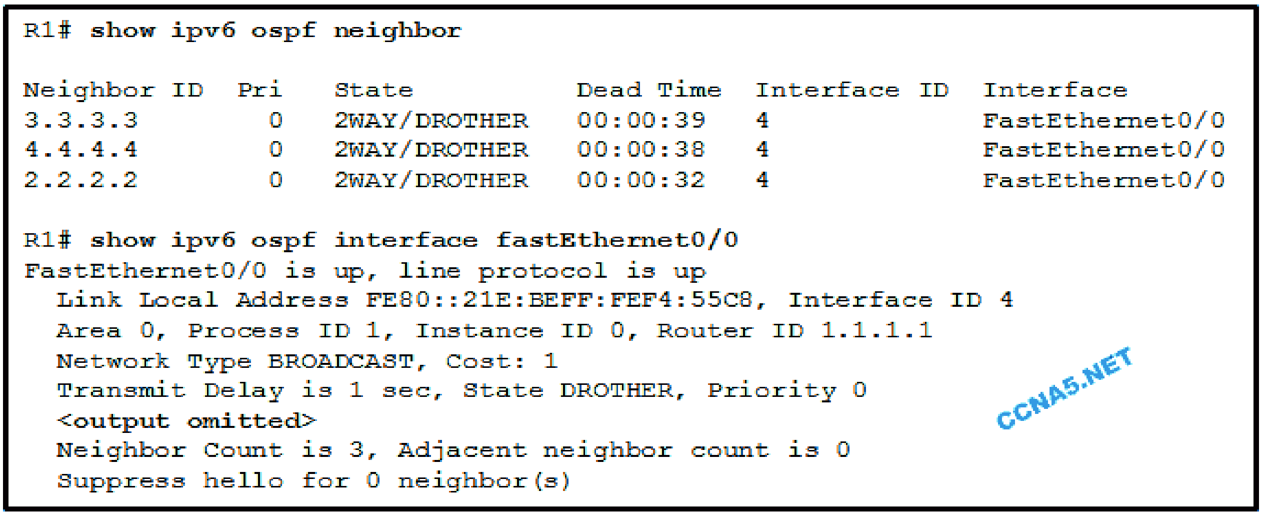
show ip protocols*

show ip ospf interface

show ip interface brief

show ip route ospf

18



```
R1# show ipv6 ospf neighbor

Neighbor ID   Pri   State           Dead Time   Interface ID   Interface
3.3.3.3         0   2WAY/DROTHER    00:00:39    4              FastEthernet0/0
4.4.4.4         0   2WAY/DROTHER    00:00:38    4              FastEthernet0/0
2.2.2.2         0   2WAY/DROTHER    00:00:32    4              FastEthernet0/0

R1# show ipv6 ospf interface fastEthernet0/0
FastEthernet0/0 is up, line protocol is up
  Link Local Address FE80::21E:BEFF:FEF4:55C8, Interface ID 4
  Area 0, Process ID 1, Instance ID 0, Router ID 1.1.1.1
  Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DROTHER, Priority 0
  <output omitted>
  Neighbor Count is 3, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
```

CCNA5.NET

Refer to the exhibit. Four routers are connected to an Ethernet LAN segment and are configured to run OSPFv3. However, none of the routers are receiving routing updates. What is the cause of the problem?

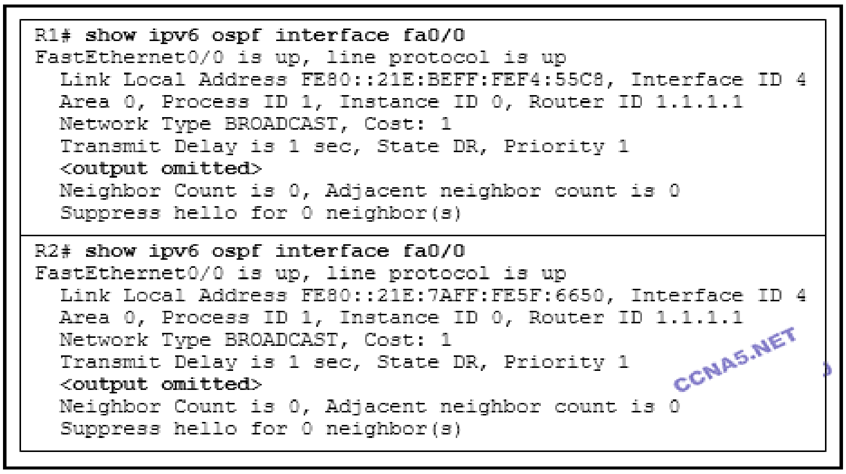
The routers are using IPv6 link local addresses to communicate.

The network type has been set to BROADCAST instead of NBMA.

The routers are using IPv4 addresses for router IDs.

All of the routers have an OSPFv3 interface priority of 0.*

19



```
R1# show ipv6 ospf interface fa0/0
FastEthernet0/0 is up, line protocol is up
  Link Local Address FE80::21E:BEFF:FEF4:55C8, Interface ID 4
  Area 0, Process ID 1, Instance ID 0, Router ID 1.1.1.1
  Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  <output omitted>
  Neighbor Count is 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
```

```
R2# show ipv6 ospf interface fa0/0
FastEthernet0/0 is up, line protocol is up
  Link Local Address FE80::21E:7AFF:FE5F:6650, Interface ID 4
  Area 0, Process ID 1, Instance ID 0, Router ID 1.1.1.1
  Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  <output omitted>
  Neighbor Count is 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
```

CCNA5.NET

Refer to the exhibit. These two routers are configured to run OSPFv3 but they are not forming a neighbor adjacency. What is the cause of the problem?

The routers do not have global IPv6 addresses that are configured on the Fa0/0 interfaces.

The routers have both been elected as the DR.

The routers are configured with the same router ID.*

The routers have the same priority.

20

A network engineer suspects that OSPFv3 routers are not forming neighbor adjacencies because there are interface timer mismatches. Which two commands can be issued on the interface of each OSFPv3 router to resolve all timer mismatches? (Choose two.)

no ipv6 ospf dead-interval*

no ipv6 router ospf 10

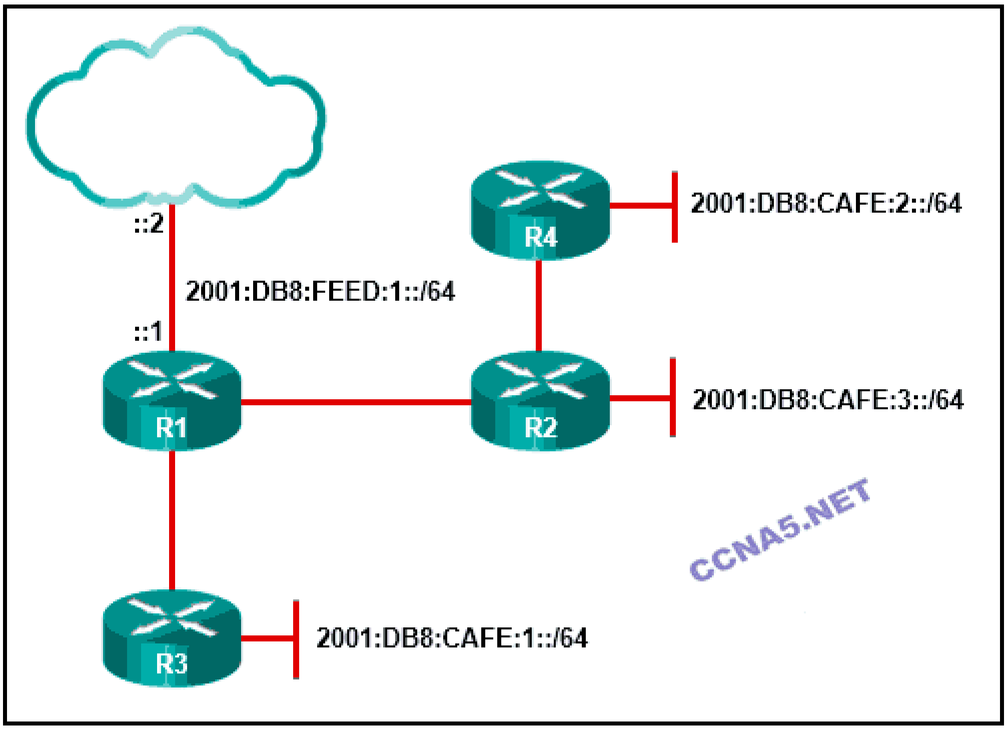
ip ospf dead-interval 40

no ipv6 ospf hello-interval*

no ipv6 ospf cost 10

ip ospf hello-interval 10

21



Refer to the exhibit. Fill in the blank. Do not use abbreviations.

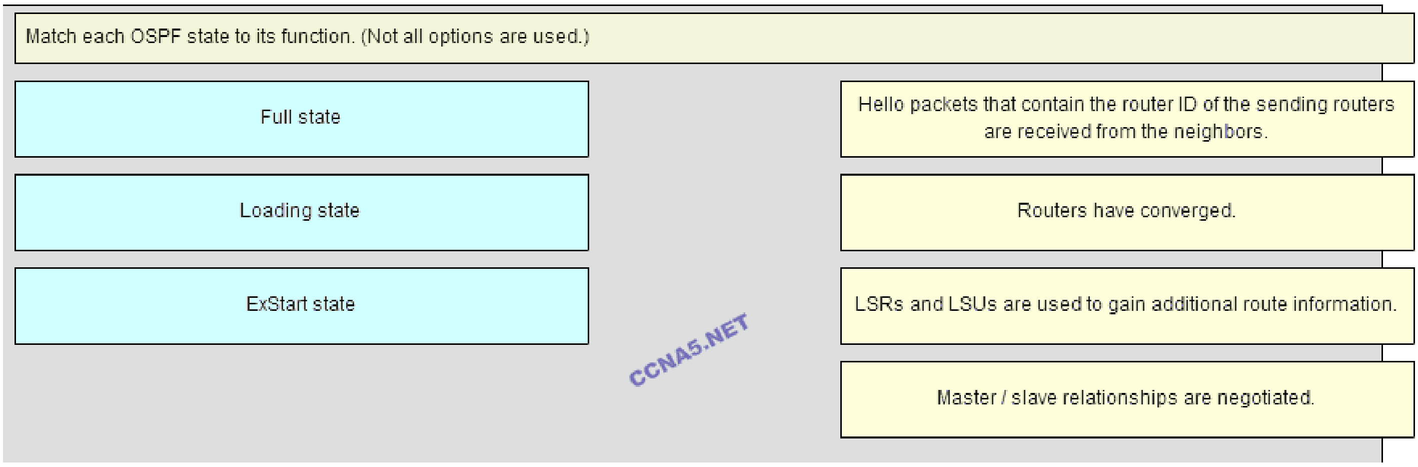
The command " **show ipv6 route** " can be issued on router R2 to verify the propagation of a static default route from R1 to R2.

22

Fill in the blank. Do not use abbreviations.

When IPv4 and OSPFv2 are being used, the command " **show ip ospf neighbor** " is used to verify that a router has formed an adjacency with its neighboring routers.

23



Match each OSPF state to its function. (Not all options are used.)

Full state

Loading state

ExStart state

Hello packets that contain the router ID of the sending routers are received from the neighbors.

Routers have converged.

LSRs and LSUs are used to gain additional route information.

Master / slave relationships are negotiated.

Place the options in the following order:

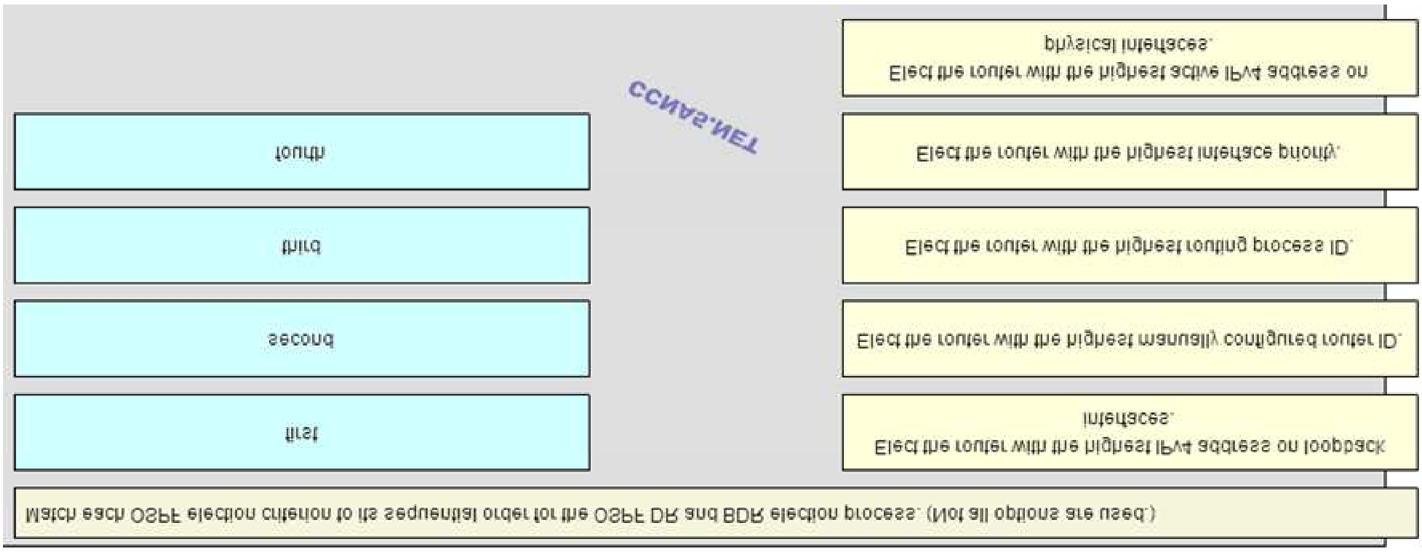
- not scored -

full state

loading state

ExStart state

24



Match each OSPF election criterion to its sequential order for the OSPF DR and BDR election process. (Not all options are used.)

first

second

third

fourth

Elect the router with the highest IPv4 address on loopback interfaces.

Elect the router with the highest manually configured router ID.

Elect the router with the highest routing process ID.

Elect the router with the highest interface priority.

Elect the router with the highest active IPv4 address on physical interfaces.

Place the options in the following order:

[+] third

[+] second

– not scored –

[+] first

[+] fourth

[+] Order does not matter within this group.

CCNA 2 Chapter 8 v5.0 Exam Answers 2013

1

Which OSPF component is identical in all routers in an OSPF area after convergence?

routing table

link-state database*

SPF tree

adjacency database

2

Which three statements describe features of the OSPF topology table? (Choose three.)

When converged, all routers in an area have identical topology tables.*

Its contents are the result of running the SPF algorithm.

After convergence, the table only contains the lowest cost route entries for all known networks.

It is a link-state database that represents the network topology.*

The topology table contains feasible successor routes.

The table can be viewed via the show ip ospf database command.*

3

A router is participating in an OPSFv2 domain. What will always happen if the dead interval expires before the router receives a hello packet from an adjacent DROTHER OPSF router?

SPF will run and determine which neighbor router is "down".

OSPF will run a new DR/BDR election.

OSPF will remove that neighbor from the router link-state database.*

A new dead interval timer of 4 times the hello interval will start.

4

Which command will provide information specific to OSPFv3 routes in the routing table?

show ip route ospf

show ip route

show ipv6 route ospf*

show ipv6 route

5

Which wildcard mask would be used to advertise the 192.168.5.96/27 network as part of an OSPF configuration?

0.0.0.32

0.0.0.31*

255.255.255.223

255.255.255.224

6

A network administrator enters the command ipv6 router ospf 64 in global configuration mode. What is the result of this command?

The OSPFv3 process will be assigned an ID of 64.*

The router will be assigned a router ID of 64.

The router will be assigned an autonomous system number of 64.

The reference bandwidth will be set to 64 Mb/s.

7

Fill in the blank.

The election of a DR and a BDR takes place on ” **point-to-point** ” networks, such as Ethernet networks.

8

Fill in the blank.

OSPF uses ” **cost** ” as a metric.

9

Which command should be used to check the OSPF process ID, the router ID, networks the router is advertising, the neighbors the router is receiving updates from, and the default administrative distance?

show ip protocols*

show ip ospf interface

show ip ospf

show ip ospf neighbor

10

Which OSPFv3 function works differently from OSPFv2?

authentication*

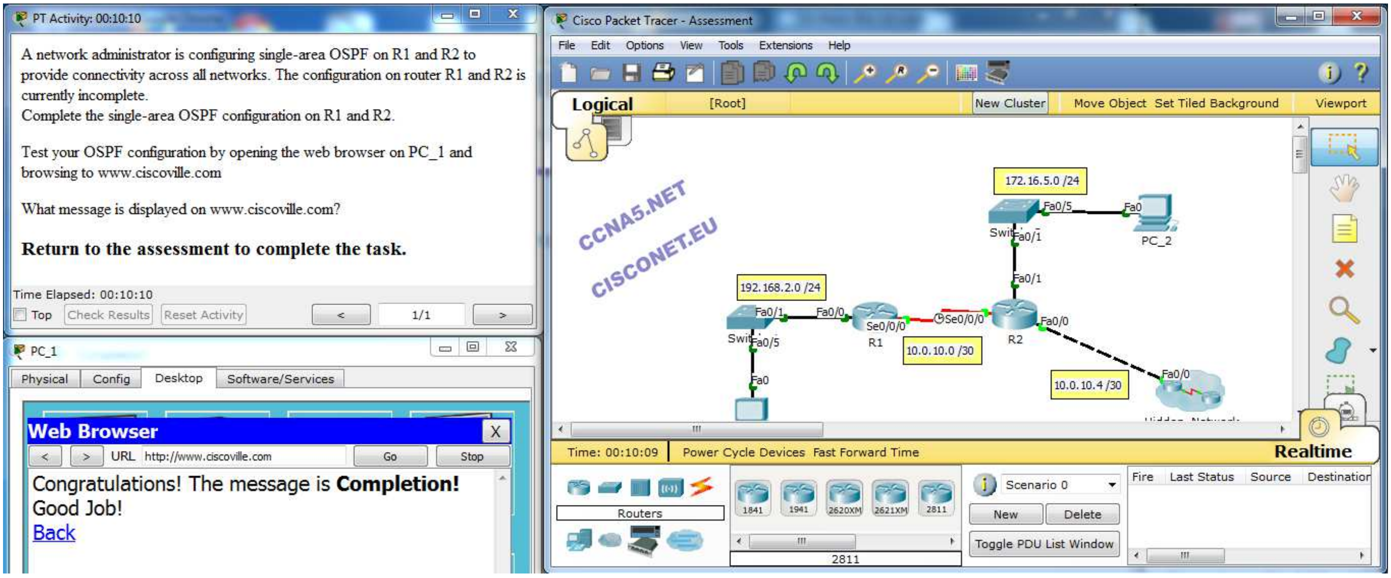
metric calculation

hello mechanism

election process

OSPF packet types

11



PT Activity: 00:10:10

A network administrator is configuring single-area OSPF on R1 and R2 to provide connectivity across all networks. The configuration on router R1 and R2 is currently incomplete.
Complete the single-area OSPF configuration on R1 and R2.

Test your OSPF configuration by opening the web browser on PC_1 and browsing to www.ciscoville.com

What message is displayed on www.ciscoville.com?

Return to the assessment to complete the task.

Time Elapsed: 00:10:10

Web Browser

URL http://www.ciscoville.com

Congratulations! The message is **Completion!**
Good Job!
Back

Launch PT - Hide and Save PT

Open the PT Activity. Perform the tasks in the activity instructions and then complete the task.

What message is displayed on www.ciscoville.com?

The correct configuration on R1 is:

router ospf 10

network 192.168.2.0 0.0.0.255 area 0

network 10.0.10.0 0.0.0.3 area 0

The correct configuration on R2 is:

router ospf 10

network 10.0.10.0 0.0.0.3 area 0

network 10.0.10.4 0.0.0.3 area 0

network 172.16.5.0 0.0.0.255 area 0

Completion!*

Converged!

Success!

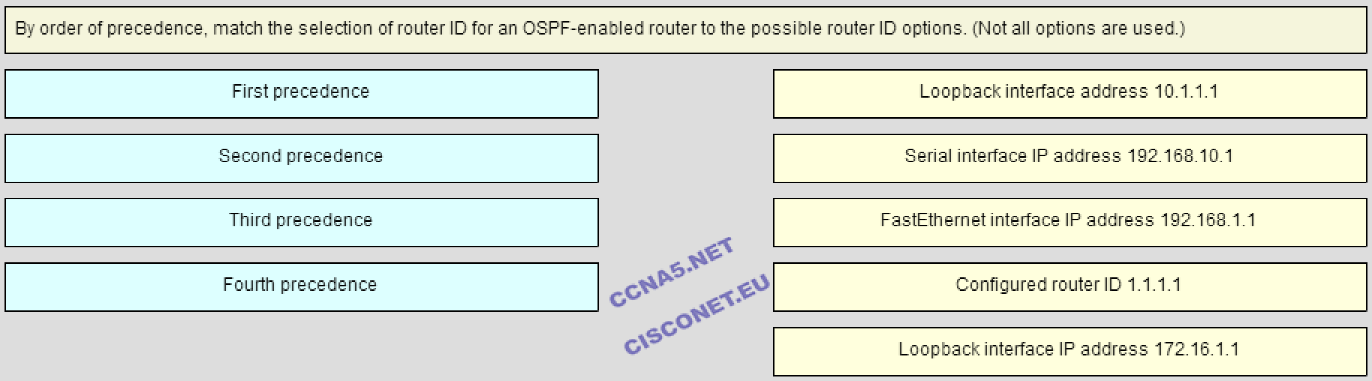
Finished

12

Fill in the blank. Do not use abbreviations.

To quickly verify OSPFv3 configuration information including the OSPF process ID, the router ID, and the interfaces enabled for OSPFv3, you need to issue the command " **show ipv6 protocols** "

13



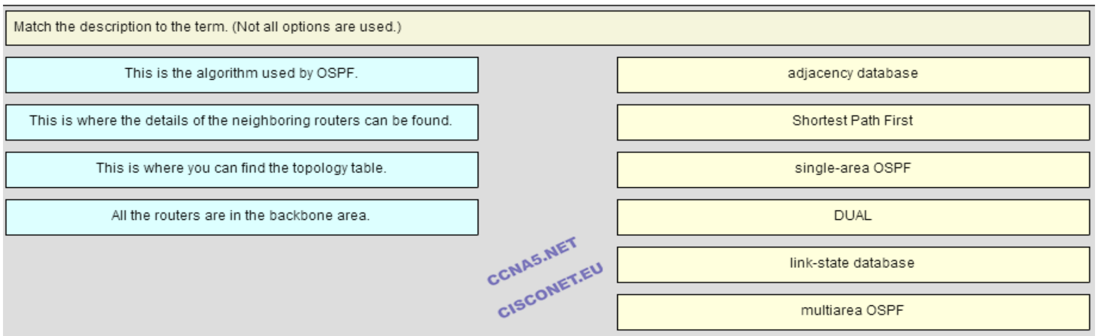
By order of precedence, match the selection of router ID for an OSPF-enabled router to the possible router ID options. (Not all options are used.)

First precedence
Second precedence
Third precedence
Fourth precedence

Loopback interface address 10.1.1.1
Serial interface IP address 192.168.10.1
FastEthernet interface IP address 192.168.1.1
Configured router ID 1.1.1.1
Loopback interface IP address 172.16.1.1

Place the options in the following order:
Third precedence
Fourth precedence
- not scored -
First precedence
Second precedence

14



Match the description to the term. (Not all options are used.)

This is the algorithm used by OSPF.
This is where the details of the neighboring routers can be found.
This is where you can find the topology table.
All the routers are in the backbone area.

adjacency database
Shortest Path First
single-area OSPF
DUAL
link-state database
multiarea OSPF

Place the options in the following order:

This is where the details of the neighboring routers can be found.
This is the algorithm used by OSPF.
All the routers are in the backbone area.
– not scored –
This is where you can find the topology table.
– not scored -

15
Which three statements describe the similarities between OSPFv2 and OSPFv3? (Choose three.)

They both have unicast routing enabled by default.
They both use the exit interface address as the source address when sending OSPF messages.
They both use the same DR/BDR election process.*
They both support IPsec for authentication.
They both share the concept of multiple areas.*
They both are link-state protocols.*

16

What is a function of OSPF hello packets?

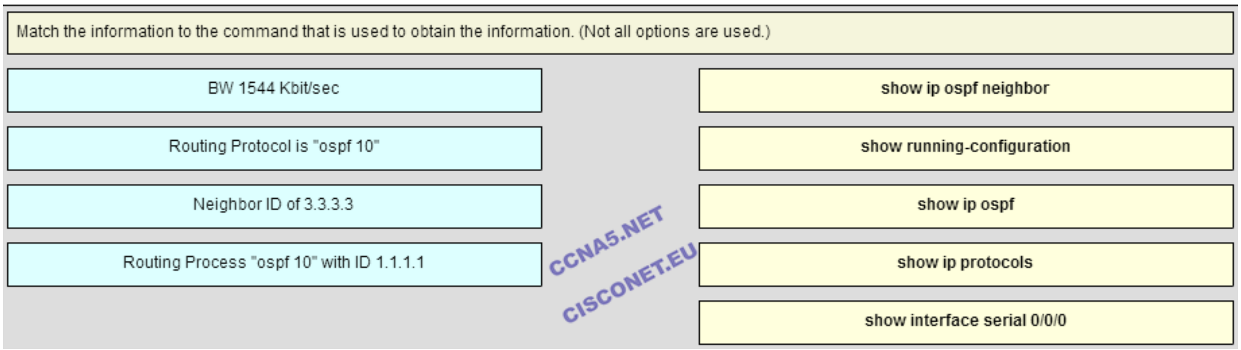
to send specifically requested link-state records

to discover neighbors and build adjacencies between them*

to request specific link-state records from neighbor routers

to ensure database synchronization between routers

17



Match the information to the command that is used to obtain the information. (Not all options are used.)

BW 1544 Kbit/sec

Routing Protocol is "ospf 10"

Neighbor ID of 3.3.3.3

Routing Process "ospf 10" with ID 1.1.1.1

show ip ospf neighbor

show running-configuration

show ip ospf

show ip protocols

show interface serial 0/0/0

Place the options in the following order:

Neighbor ID of 3.3.3.3

– not scored –

Routing Process “ospf 10″ with ID 1.1.1.1

Routing Protocol is “ospf 10″

BW 1544 Kbit/sec

18

What are the two purposes of an OSPF router ID? (Choose two.)

to uniquely identify the router within the OSPF domain*

to enable the SPF algorithm to determine the lowest cost path to remote networks

to facilitate the transition of the OSPF neighbor state to Full

to facilitate router participation in the election of the designated router*

to facilitate the establishment of network convergence

19

Which command will verify that a router that is running OSPFv3 has formed an adjacency with other routers in its OSPF area?

show ipv6 ospf neighbor*

show ipv6 route ospf

show ipv6 interface brief

show running-configuration

20

Single area OSPFv3 has been enabled on a router via the ipv6 router ospf 20 command. Which command will enable this OSPFv3 process on an interface of that router?

ipv6 ospf 20 area 0*

ipv6 ospf 20 area 20

ipv6 ospf 0 area 20

ipv6 ospf 0 area 0

21

When a network engineer is configuring OSPFv3 on a router, which command would the engineer issue immediately before configuring the router ID?

ipv6 router ospf 10*

ipv6 ospf 10 area 0

interface serial 0/0/1

clear ipv6 ospf process

22

Which criterion is preferred by the router to choose a router ID?

the IP address of the highest configured loopback interface on the router

the router-id rid command*

the IP address of the highest active OSPF-enabled interface

the IP address of the highest active interface on the router

23

Which OPSF packet contains the different types of link-state advertisements?

LSR

LSU*

DBD

LSAck

hello

24

What does a Cisco router use automatically to create link-local addresses on serial interfaces when OSPFv3 is implemented?

an Ethernet interface MAC address available on the router, the FE80::/10 prefix, and the EUI-64 process*

the MAC address of the serial interface, the FE80::/10 prefix, and the EUI-64 process

the FE80::/10 prefix and the EUI-48 process

the highest MAC address available on the router, the FE80::/10 prefix, and the EUI-48 process

CCNA 2 Chapter 9 v5.0 Exam Answers 2013

1

A network administrator needs to configure a standard ACL so that only the workstation of the administrator with the IP address 192.168.15.23 can access the virtual terminal of the main router. Which two configuration commands can achieve the task? (Choose two.)

Router1(config)# access-list 10 permit 192.168.15.23 255.255.255.0

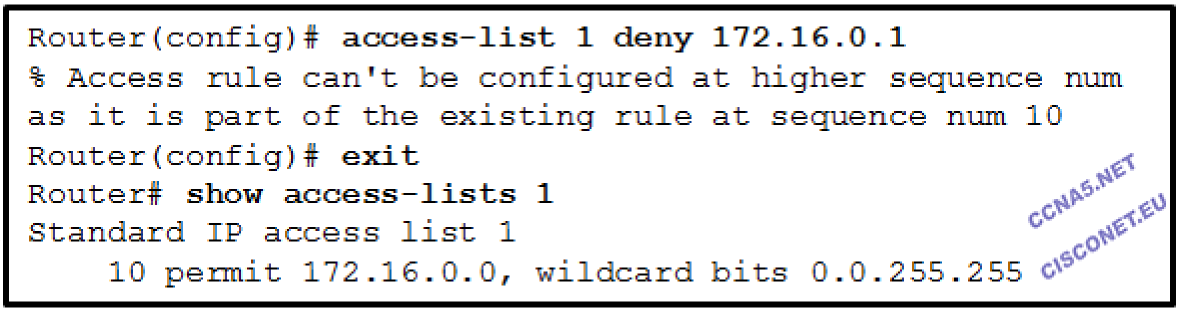
Router1(config)# access-list 10 permit 192.168.15.23 0.0.0.0*

Router1(config)# access-list 10 permit 192.168.15.23 0.0.0.255

Router1(config)# access-list 10 permit 192.168.15.23 255.255.255.255

Router1(config)# access-list 10 permit host 192.168.15.23*

2



```
Router(config)# access-list 1 deny 172.16.0.1
% Access rule can't be configured at higher sequence num
as it is part of the existing rule at sequence num 10
Router(config)# exit
Router# show access-lists 1
Standard IP access list 1
    10 permit 172.16.0.0, wildcard bits 0.0.255.255
```

Refer to the exhibit. A router has an existing ACL that permits all traffic from the 172.16.0.0 network. The administrator attempts to add a new ACE to the ACL that denies packets from host 172.16.0.1 and receives the error message that is shown in the exhibit. What action can the administrator take to block packets from host 172.16.0.1 while still permitting all other traffic from the 172.16.0.0 network?

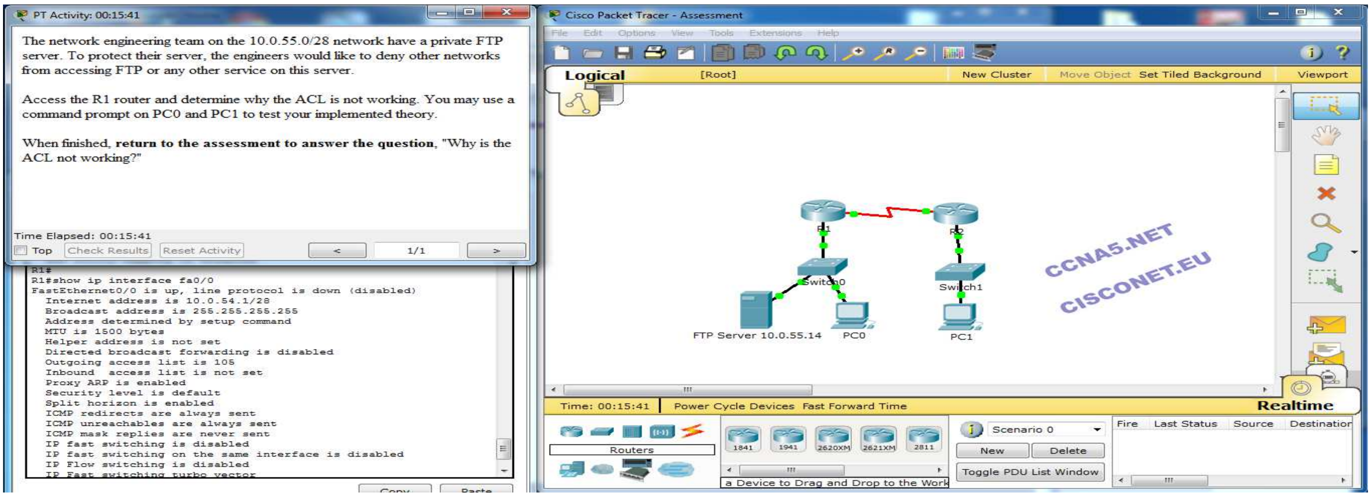
Manually add the new deny ACE with a sequence number of 5.*

Manually add the new deny ACE with a sequence number of 15.

Add a deny any any ACE to access-list 1.

Create a second access list denying the host and apply it to the same interface.

3



The network engineering team on the 10.0.55.0/28 network have a private FTP server. To protect their server, the engineers would like to deny other networks from accessing FTP or any other service on this server.

Access the R1 router and determine why the ACL is not working. You may use a command prompt on PC0 and PC1 to test your implemented theory.

When finished, **return to the assessment to answer the question**, "Why is the ACL not working?"

```
R1#
R1#show ip interface fa0/0
FastEthernet0/0 is up, line protocol is down (disabled)
  Internet address is 10.0.54.1/28
  Broadcast address is 255.255.255.255
  Address determined by setup command
  MTU is 1500 bytes
  Helper address is not set
  Directed broadcast forwarding is disabled
  Outgoing access list is 105
  Inbound  access list is not set
  Proxy ARP is enabled
  Security level is default
  Split horizon is enabled
  ICMP redirects are always sent
  ICMP unreachables are always sent
  ICMP mask replies are never sent
  IP fast switching is disabled
  IP fast switching on the same interface is disabled
  IP Flow switching is disabled
  IP Fast switching turbo vector
```

Launch PT – Hide and Save PT

Open the PT Activity. Perform the tasks in the activity instructions and then answer the question.

Why is the ACL not working?

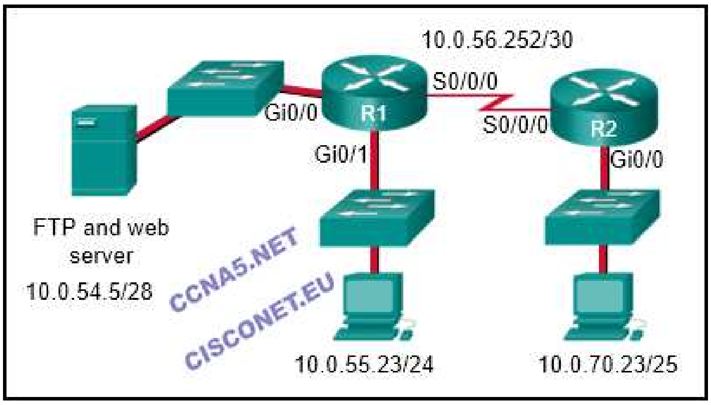
The ACL is missing a deny ip any any ACE.
The ACL is applied in the wrong direction.
The access-list 105 command or commands are incorrect.
The ACL is applied to the wrong interface.*
No ACL is needed for this scenario.

4

Which statement describes a characteristic of standard IPv4 ACLs?

They are configured in the interface configuration mode.
They can be created with a number but not with a name.
They filter traffic based on source IP addresses only.*
They can be configured to filter traffic based on both source IP addresses and source ports.

5



Refer to the exhibit. The network administrator that has the IP address of 10.0.70.23/25 needs to have access to the corporate FTP server (10.0.54.5/28). The FTP server is also a web server that is accessible to all internal employees on networks within the 10.x.x.x address. No other traffic should be allowed to this server. Which extended ACL would be used to filter this traffic, and how would this ACL be applied? (Choose two.)

access-list 105 permit ip host 10.0.70.23 host 10.0.54.5
access-list 105 permit tcp any host 10.0.54.5 eq www
access-list 105 permit ip any any

R1(config)# interface s0/0/0
R1(config-if)# ip access-group 105 out

R1(config)# interface gi0/0
R1(config-if)# ip access-group 105 out ****************

access-list 105 permit tcp host 10.0.70.23 host 10.0.54.5 eq 20
access-list 105 permit tcp host 10.0.70.23 host 10.0.54.5 eq 21
access-list 105 permit tcp 10.0.0.0 0.255.255.255 host 10.0.54.5 eq www
access-list 105 deny ip any host 10.0.54.5
access-list 105 permit ip any any ******************

access-list 105 permit tcp host 10.0.54.5 any eq www
access-list 105 permit tcp host 10.0.70.23 host 10.0.54.5 eq 20
access-list 105 permit tcp host 10.0.70.23 host 10.0.54.5 eq 21

R2(config)# interface gi0/0
R2(config-if)# ip access-group 105 in

6

What are two possible uses of access control lists in an enterprise network? (Choose two.)

limiting debug outputs*
reducing the processing load on routers
controlling the physical status of router interfaces
controlling virtual terminal access to routers*
allowing Layer 2 traffic to be filtered by a router

7

An administrator has configured an access list on R1 to allow SSH administrative access from host 172.16.1.100. Which command correctly applies the ACL?

R1(config-line)# access-class 1 out
R1(config-line)# access-class 1 in*
R1(config-if)# ip access-group 1 out
R1(config-if)# ip access-group 1 in

8

Which three statements are generally considered to be best practices in the placement of ACLs? (Choose three.)

Place extended ACLs close to the source IP address of the traffic.*
For every inbound ACL placed on an interface, there should be a matching outbound ACL.
Place extended ACLs close to the destination IP address of the traffic.
Place standard ACLs close to the destination IP address of the traffic.*
Filter unwanted traffic before it travels onto a low-bandwidth link.*
Place standard ACLs close to the source IP address of the traffic.

9

Which three implicit access control entries are automatically added to the end of an IPv6 ACL? (Choose three.)

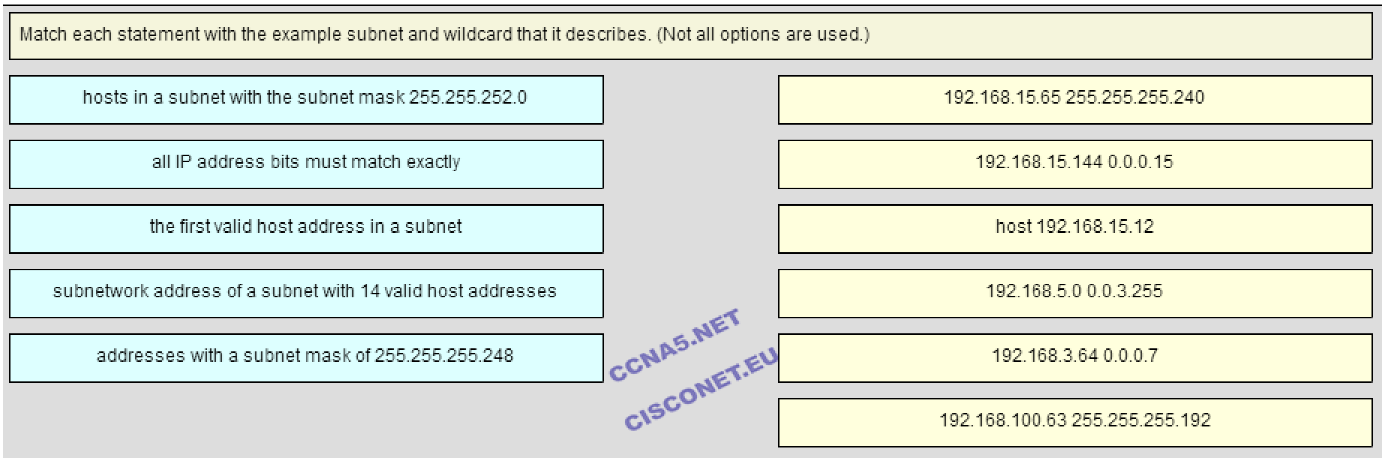
deny icmp any any
deny ipv6 any any*
permit icmp any any nd-ns*
permit ipv6 any any
deny ip any any
permit icmp any any nd-na*

10

Which two characteristics are shared by both standard and extended ACLs? (Choose two.)

Both filter packets for a specific destination host IP address.
Both can be created by using either a descriptive name or number.*
Both include an implicit deny as a final ACE.*
Both can permit or deny specific services by port number.
Both kinds of ACLs can filter based on protocol type.

11



Match each statement with the example subnet and wildcard that it describes. (Not all options are used.)

hosts in a subnet with the subnet mask 255.255.252.0
all IP address bits must match exactly
the first valid host address in a subnet
subnetwork address of a subnet with 14 valid host addresses
addresses with a subnet mask of 255.255.255.248

192.168.15.65 255.255.255.240
192.168.15.144 0.0.0.15
host 192.168.15.12
192.168.5.0 0.0.3.255
192.168.3.64 0.0.0.7
192.168.100.63 255.255.255.192

CCNA5.NET
CISCONET.EU

Place the options in the following order:

the first valid host address in a subnet
subnetwork address of a subnet with 14 valid host addresses
all IP address bits must match exactly
hosts in a subnet with the subnet mask 255.255.252.0
addresses with a subnet mask of 255.255.255.248
– not scored -

12

Consider the following access list that allows IP phone configuration file transfers from a particular host to a TFTP server:

R1(config)# access-list 105 permit udp host 10.0.70.23 host 10.0.54.5 range 1024 5000
R1(config)# access-list 105 deny ip any any
R1(config)# interface gi0/0
R1(config-if)# ip access-group 105 out

Which method would allow the network administrator to modify the ACL and include FTP transfers from any source IP address?

R1(config)# interface gi0/0
R1(config-if)# no ip access-group 105 out
R1(config)# access-list 105 permit tcp any host 10.0.54.5 eq 20
R1(config)# access-list 105 permit tcp any host 10.0.54.5 eq 21
R1(config)# interface gi0/0
R1(config-if)# ip access-group 105 out

R1(config)# access-list 105 permit tcp any host 10.0.54.5 eq 20
R1(config)# access-list 105 permit tcp any host 10.0.54.5 eq 21

R1(config)# access-list 105 permit udp host 10.0.70.23 host 10.0.54.5 range 1024 5000
R1(config)# access-list 105 permit tcp any host 10.0.54.5 eq 20
R1(config)# access-list 105 permit tcp any host 10.0.54.5 eq 21
R1(config)# access-list 105 deny ip any any
R1(config)# interface gi0/0
R1(config-if)# no ip access-group 105 out
R1(config)# no access-list 105
R1(config)# access-list 105 permit udp host 10.0.70.23 host 10.0.54.5 range 1024 5000
R1(config)# access-list 105 permit tcp any host 10.0.54.5 eq 20
R1(config)# access-list 105 permit tcp any host 10.0.54.5 eq 21
R1(config)# access-list 105 deny ip any any
R1(config)# interface gi0/0
R1(config-if)# ip access-group 105 out ****************

13
What two functions describe uses of an access control list? (Choose two.)

ACLs provide a basic level of security for network access.*
ACLs can control which areas a host can access on a network.*
Standard ACLs can restrict access to specific applications and ports.
ACLs can permit or deny traffic based upon the MAC address originating on the router.
ACLs assist the router in determining the best path to a destination.

14
Which feature is unique to IPv6 ACLs when compared to those of IPv4 ACLs?

an implicit permit of neighbor discovery packets*
an implicit deny any any ACE
the use of named ACL entries
the use of wildcard masks

15
Which three statements describe ACL processing of packets? (Choose three.)

Each packet is compared to the conditions of every ACE in the ACL before a forwarding decision is made.
A packet that has been denied by one ACE can be permitted by a subsequent ACE.
Each statement is checked only until a match is detected or until the end of the ACE list.*
An implicit deny any rejects any packet that does not match any ACE.*
A packet that does not match the conditions of any ACE will be forwarded by default.
A packet can either be rejected or forwarded as directed by the ACE that is matched.*

16
Which statement describes a difference between the operation of inbound and outbound ACLs?

On a network interface, more than one inbound ACL can be configured but only one outbound ACL can be configured.
In contrast to outbound ALCs, inbound ACLs can be used to filter packets with multiple criteria.
Inbound ACLs are processed before the packets are routed while outbound ACLs are processed after the routing is completed.*
Inbound ACLs can be used in both routers and switches but outbound ACLs can be used only on routers.

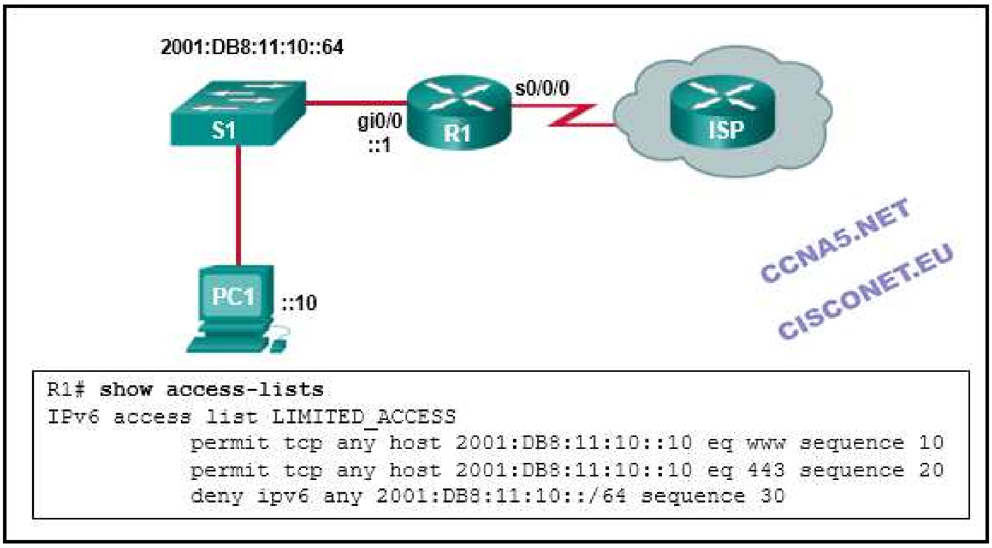
17
What is the only type of ACL available for IPv6?

named standard
numbered extended
named extended*
numbered standard

18
Which IPv6 ACL command entry will permit traffic from any host to an SMTP server on network 2001:DB8:10:10::/64?

permit tcp any host 2001:DB8:10:10::100 eq 23
permit tcp host 2001:DB8:10:10::100 any eq 23
permit tcp host 2001:DB8:10:10::100 any eq 25
permit tcp any host 2001:DB8:10:10::100 eq 25*

19



```
R1# show access-lists
IPv6 access list LIMITED_ACCESS
          permit tcp any host 2001:DB8:11:10::10 eq www sequence 10
          permit tcp any host 2001:DB8:11:10::10 eq 443 sequence 20
          deny ipv6 any 2001:DB8:11:10::/64 sequence 30
```

Refer to the exhibit. The IPv6 access list LIMITED_ACCESS is applied on the S0/0/0 interface of R1 in the inbound direction. Which IPv6 packets from the ISP will be dropped by the ACL on R1?

neighbor advertisements that are received from the ISP router

ICMPv6 packets that are destined to PC1*

packets that are destined to PC1 on port 80

HTTPS packets to PC1

20

If a router has two interfaces and is routing both IPv4 and IPv6 traffic, how many ACLs could be created and applied to it?

4

8*

6

16

12

21

Which IPv4 address range covers all IP addresses that match the ACL filter specified by 172.16.2.0 with wildcard mask 0.0.1.255?

172.16.2.1 to 172.16.255.255

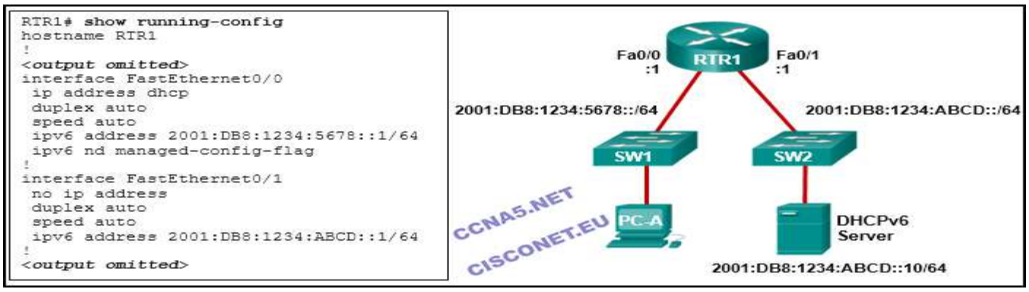
172.16.2.1 to 172.16.3.254

172.16.2.0 to 172.16.2.255

172.16.2.0 to 172.16.3.255*

CCNA 2 Chapter 10 v5.0 Exam Answers 2013

1



```
RTR1# show running-config
hostname RTR1
!
<output omitted>
interface FastEthernet0/0
 ip address dhcp
 duplex auto
 speed auto
 ipv6 address 2001:DB8:1234:5678::1/64
 ipv6 nd managed-config-flag
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 ipv6 address 2001:DB8:1234:ABCD::1/64
!
<output omitted>
```

Refer to the exhibit. What should be done to allow PC-A to receive an IPv6 address from the DHCPv6 server?

Add the IPv6 address 2001:DB8:1234:5678::10/64 to the interface configuration of the DHCPv6 server.
Configure the ipv6 nd managed-config-flag command on interface Fa0/1.
Change the ipv6 nd managed-config-flag command to ipv6 nd other-config-flag.
Add the ipv6 dhcp relay command to interface Fa0/0.*

2

What is the reason why the DHCPREQUEST message is sent as a broadcast during the DHCPv4 process?

for routers to fill their routing tables with this new information
to notify other hosts not to request the same IP address
to notify other DHCP servers on the subnet that the IP address was leased*
for hosts on other subnets to receive the information

3

A company uses DHCP servers to dynamically assign IPv4 addresses to employee workstations. The address lease duration is set as 5 days. An employee returns to the office after an absence of one week. When the employee boots the workstation, it sends a message to obtain an IP address. Which Layer 2 and Layer 3 destination addresses will the message contain?

FF-FF-FF-FF-FF-FF and 255.255.255.255*
MAC address of the DHCP server and 255.255.255.255
FF-FF-FF-FF-FF-FF and IPv4 address of the DHCP server
both MAC and IPv4 addresses of the DHCP server

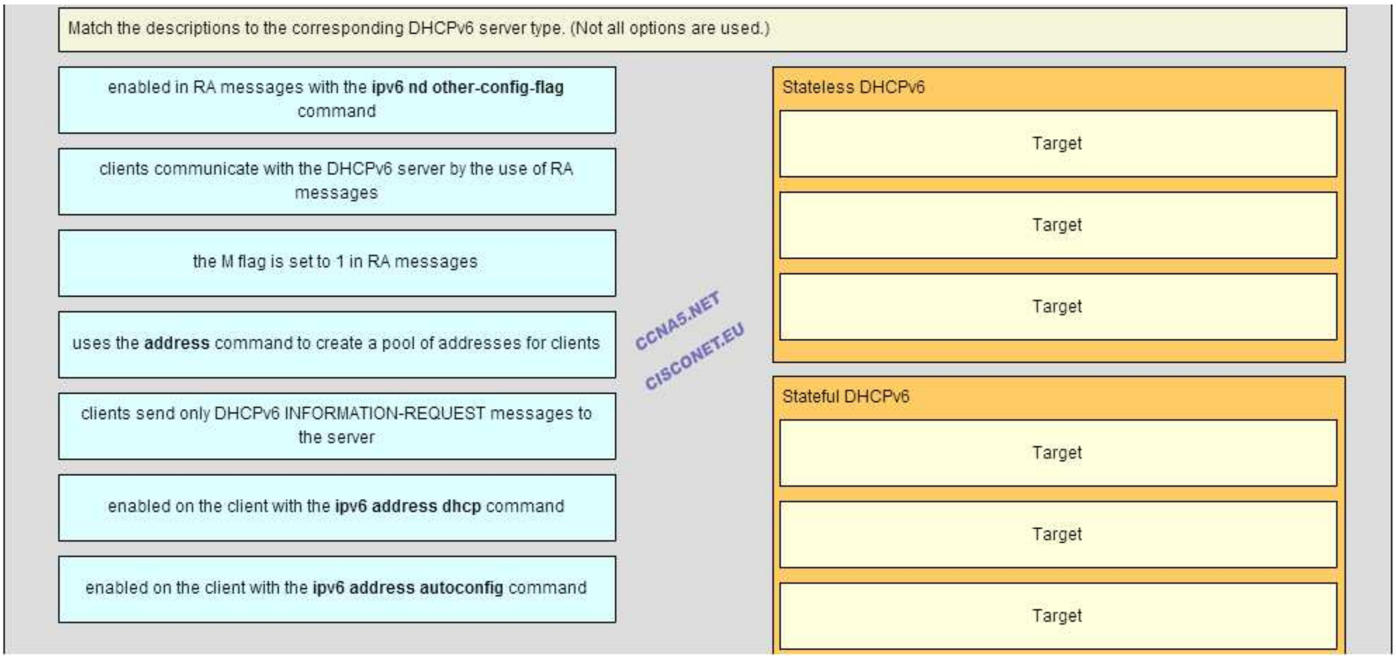
4

Fill in the blank. Do not abbreviate.

Type a command to exclude the first fifteen useable IP addresses from a DHCPv4 address pool of the network 10.0.15.0/24.

Router(config)# **ip dhcp** ” **excluded-address 10.0.15.1 10.0.15.15**”

5



Match the descriptions to the corresponding DHCPv6 server type. (Not all options are used.)

- enabled in RA messages with the **ipv6 nd other-config-flag** command
- clients communicate with the DHCPv6 server by the use of RA messages
- the M flag is set to 1 in RA messages
- uses the **address** command to create a pool of addresses for clients
- clients send only DHCPv6 INFORMATION-REQUEST messages to the server
- enabled on the client with the **ipv6 address dhcp** command
- enabled on the client with the **ipv6 address autoconfig** command

Stateless DHCPv6

Target

Target

Target

Stateful DHCPv6

Target

Target

Target

Place the options in the following order:

[+] enabled in RA messages with the ipv6 nd other-config-flag command

[+] clients send only DHCPv6 INFORMATION-REQUEST messages to the server

[+] enabled on the client with the ipv6 address autoconfig command

[#] the M flag is set to 1 in RA messages

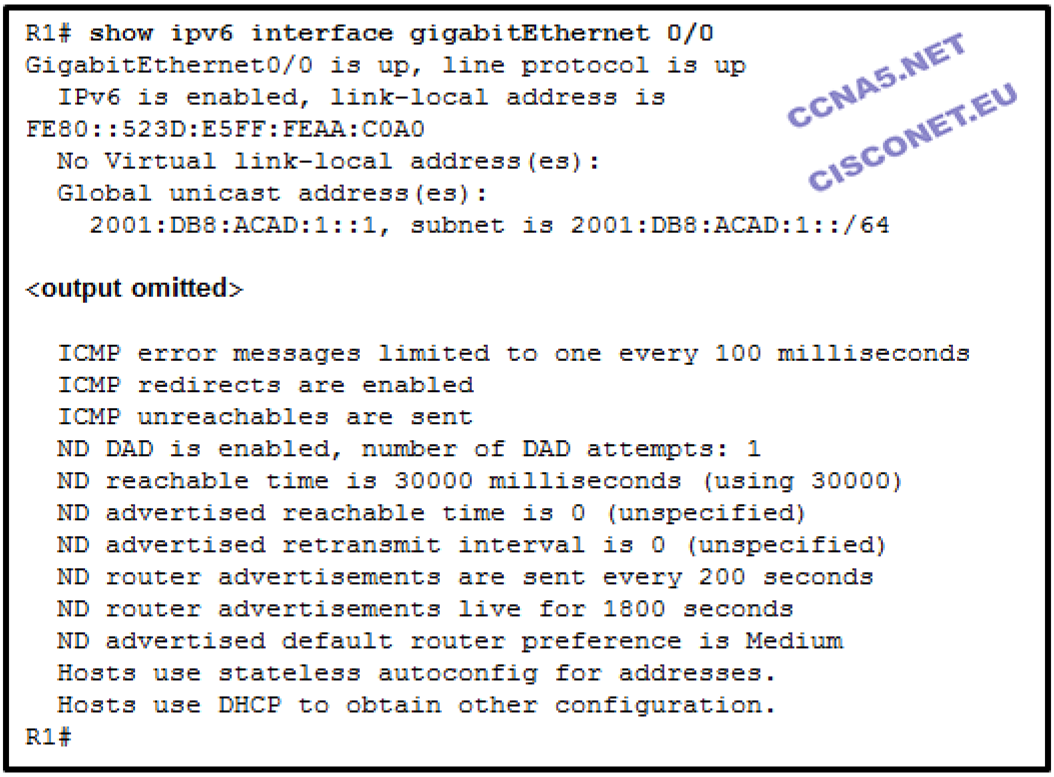
[#] uses the address command to create a pool of addresses for clients

[#] enabled on the client with the ipv6 address dhcp command

[+] Order does not matter within this group.

[#] Order does not matter within this group.

6



```
R1# show ipv6 interface gigabitEthernet 0/0
GigabitEthernet0/0 is up, line protocol is up
  IPv6 is enabled, link-local address is
FE80::523D:E5FF:FEAA:C0A0
  No Virtual link-local address(es):
  Global unicast address(es):
    2001:DB8:ACAD:1::1, subnet is 2001:DB8:ACAD:1::/64

<output omitted>

  ICMP error messages limited to one every 100 milliseconds
  ICMP redirects are enabled
  ICMP unreachables are sent
  ND DAD is enabled, number of DAD attempts: 1
  ND reachable time is 30000 milliseconds (using 30000)
  ND advertised reachable time is 0 (unspecified)
  ND advertised retransmit interval is 0 (unspecified)
  ND router advertisements are sent every 200 seconds
  ND router advertisements live for 1800 seconds
  ND advertised default router preference is Medium
  Hosts use stateless autoconfig for addresses.
  Hosts use DHCP to obtain other configuration.
R1#
```

Refer to the exhibit. A network administrator is implementing stateful DHCPv6 operation for the

company. However, the clients are not using the prefix and prefix-length information that is configured in the DHCP pool. The administrator issues a show ipv6 interface command. What could be the cause of the problem?

The router is configured for stateless DHCPv6 operation.*
No virtual link-local address is configured.
The router is configured for SLAAC DHCPv6 operation.
The Duplicate Address Detection feature is disabled.

7

A network engineer is troubleshooting hosts on a LAN that are not being assigned an IPv4 address from a DHCP server after a new Ethernet switch has been installed on the LAN. The configuration of the DHCP server has been confirmed as correct and the clients have network connectivity to other networks if a static IP address is configured on each one. What step should the engineer take next to solve the issue?

Issue the ipconfig/release command on each client.
Issue the show ip dhcp binding command on the switch.
Issue the show interface command on the router to confirm that the LAN gateway is operational.
Confirm that ports on the Layer 2 LAN switch are configured as edge ports.*

8

A network administrator configures a router to send RA messages with M flag as 0 and O flag as 1. Which statement describes the effect of this configuration when a PC tries to configure its IPv6 address?

It should use the information that is contained in the RA message exclusively.
It should contact a DHCPv6 server for the prefix, the prefix-length information, and an interface ID that is both random and unique.
It should use the information that is contained in the RA message and contact a DHCPv6 server for additional information.*
It should contact a DHCPv6 server for all the information that it needs.

9

Which protocol supports Stateless Address Autoconfiguration (SLAAC) for dynamic assignment of IPv6 addresses to a host?

UDP
ICMPv6*
ARPv6
DHCPv6

10

A network administrator is implementing DHCPv6 for the company. The administrator configures a router to send RA messages with M flag as 1 by using the interface command ipv6

nd managed-config-flag. What effect will this configuration have on the operation of the clients?

Clients must use the prefix and prefix length that are provided by a DHCPv6 server and generate a random interface ID.
Clients must use the information that is contained in RA messages.
Clients must use the prefix and prefix length that are provided by RA messages and obtain additional information from a DHCPv6 server.
Clients must use all configuration information that is provided by a DHCPv6 server.*

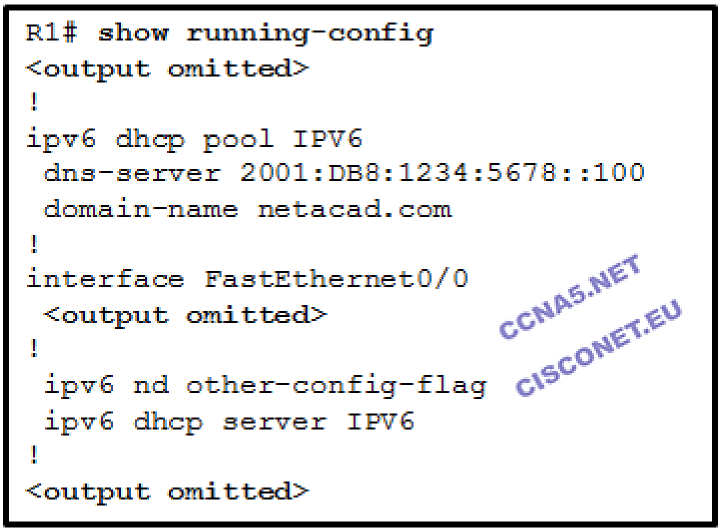
11
Under which two circumstances would a router usually be configured as a DHCPv4 client? (Choose two.)

The router is meant to provide IP addresses to the hosts.
The router has a fixed IP address.
The router is intended to be used as a SOHO gateway.*
The administrator needs the router to act as a relay agent.
This is an ISP requirement.*

12
A company uses the SLAAC method to configure IPv6 addresses for the employee workstations. Which address will a client use as its default gateway?

the unique local address of the router interface that is attached to the network
the global unicast address of the router interface that is attached to the network
the link-local address of the router interface that is attached to the network*
the all-routers multicast address

13



```
R1# show running-config
<output omitted>
!
ipv6 dhcp pool IPV6
 dns-server 2001:DB8:1234:5678::100
 domain-name netacad.com
!
interface FastEthernet0/0
 <output omitted>
!
 ipv6 nd other-config-flag
 ipv6 dhcp server IPV6
!
<output omitted>
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. Based on the output that is shown, what kind of IPv6 addressing is being configured?

static link-local
stateful DHCPv6
stateless DHCPv6*
SLAAC

14
A company implements the stateless DHCPv6 method for configuring IPv6 addresses on employee workstations. After a workstation receives messages from multiple DHCPv6 servers to indicate their availability for DHCPv6 service, which message does it send to a server for configuration information?

DHCPv6 INFORMATION-REQUEST*
DHCPv6 ADVERTISE
DHCPv6 REQUEST
DHCPv6 SOLICIT

15
An administrator issues the commands:

```
Router(config)# interface g0/1
Router(config-if)# ip address dhcp
```

What is the administrator trying to achieve?

configuring the router to obtain IP parameters from a DHCPv4 server*
configuring the router to act as a relay agent
configuring the router to resolve IP address conflicts
configuring the router to act as a DHCPv4 server

16
Which set of commands will configure a router as a DHCP server that will assign IPv4 addresses to the 192.168.100.0/23 LAN while reserving the first 10 and the last addresses for static assignment?

```
dhcp pool LAN-POOL-100
ip dhcp excluded-address 192.168.100.1 192.168.100.9
ip dhcp excluded-address 192.168.100.254
network 192.168.100.0 255.255.254.0
default-router 192.168.101.1
```

```
ip dhcp excluded-address 192.168.100.1 192.168.100.9
ip dhcp excluded-address 192.168.101.254
ip dhcp pool LAN-POOL-100
ip network 192.168.100.0 255.255.254.0
ip default-gateway 192.168.100.1
```

ip dhcp excluded-address 192.168.100.1 192.168.100.10

ip dhcp excluded-address 192.168.101.254

ip dhcp pool LAN-POOL-100

network 192.168.100.0 255.255.254.0

default-router 192.168.100.1 ************************

ip dhcp excluded-address 192.168.100.1 192.168.100.10

ip dhcp excluded-address 192.168.100.254

ip dhcp pool LAN-POOL-100

network 192.168.100.0 255.255.255.0

ip default-gateway 192.168.100.1

17

Which DHCPv4 message will a client send to accept an IPv4 address that is offered by a DHCP server?

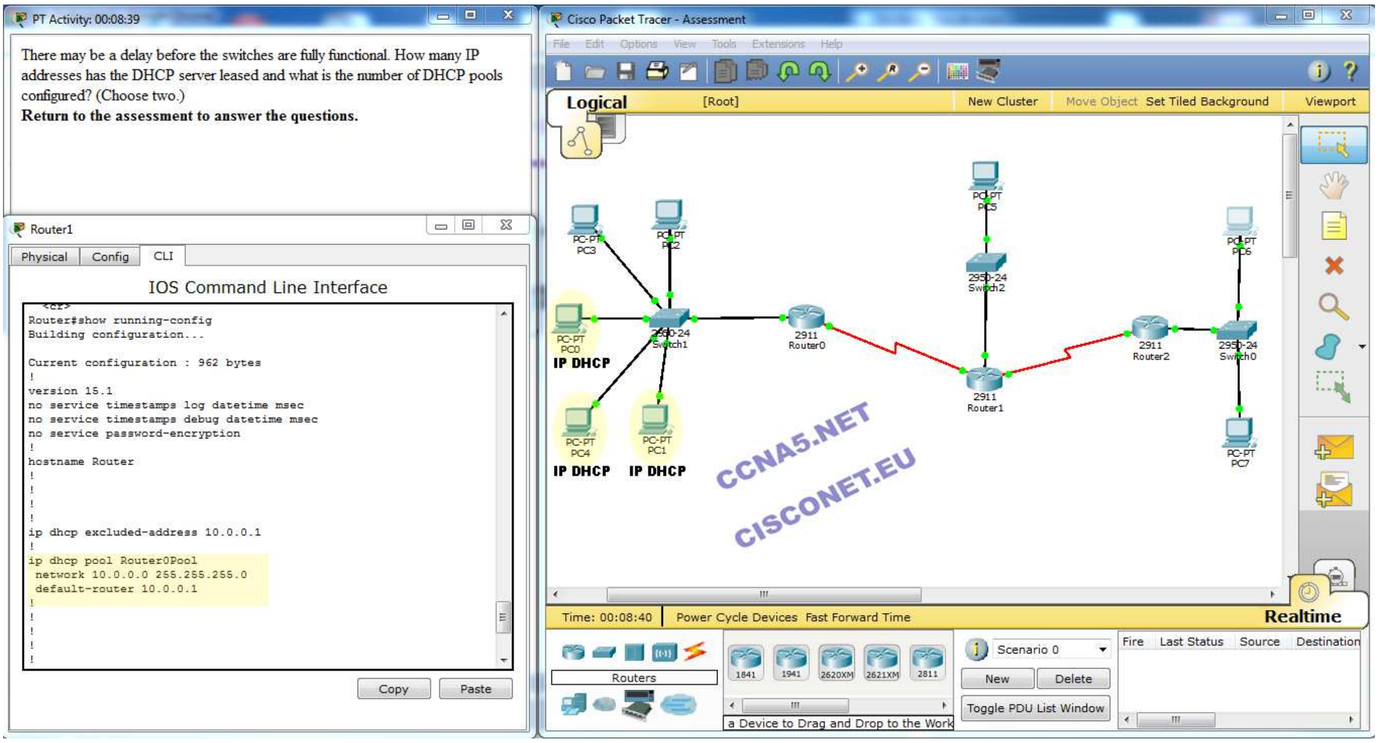
broadcast DHCPACK

unicast DHCPACK

broadcast DHCPREQUEST*

unicast DHCPREQUEST

18



PT Activity: 00:08:39

There may be a delay before the switches are fully functional. How many IP addresses has the DHCP server leased and what is the number of DHCP pools configured? (Choose two.)
Return to the assessment to answer the questions.

Router1

```
  <cr>
Router#show running-config
Building configuration...

Current configuration : 962 bytes
!
version 15.1
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
!
ip dhcp excluded-address 10.0.0.1
!
ip dhcp pool Router0Pool
 network 10.0.0.0 255.255.255.0
 default-router 10.0.0.1
!
!
!
!
!
```

Launch PT Hide and Save PT

Open the PT Activity. Perform the tasks in the activity instructions and then answer the question.

How many IP addresses has the DHCP server leased and what is the number of DHCP pools configured? (Choose two.)

one pool*

three leases*

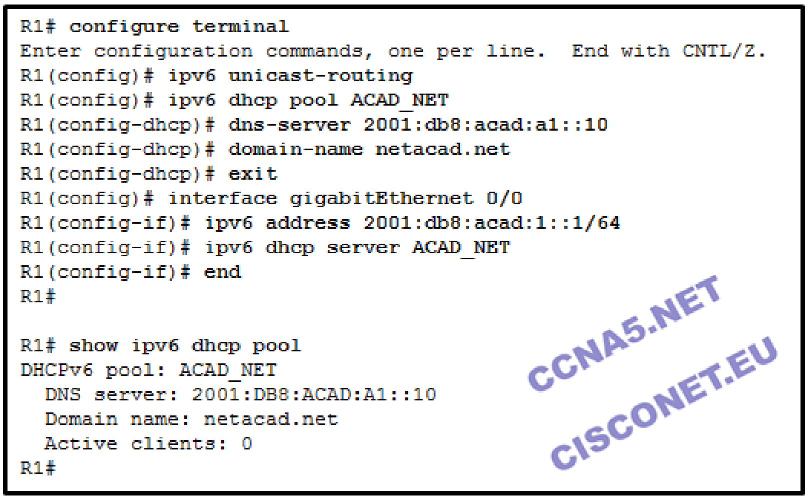
two pools

six pools

seven leases

five leases

19



```
R1# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)# ipv6 unicast-routing
R1(config)# ipv6 dhcp pool ACAD_NET
R1(config-dhcp)# dns-server 2001:db8:acad:a1::10
R1(config-dhcp)# domain-name netacad.net
R1(config-dhcp)# exit
R1(config)# interface gigabitEthernet 0/0
R1(config-if)# ipv6 address 2001:db8:acad:1::1/64
R1(config-if)# ipv6 dhcp server ACAD_NET
R1(config-if)# end
R1#

R1# show ipv6 dhcp pool
DHCPv6 pool: ACAD_NET
  DNS server: 2001:DB8:ACAD:A1::10
  Domain name: netacad.net
  Active clients: 0
R1#
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. A network administrator is implementing the stateless DHCPv6 operation for the company. Clients are configuring IPv6 addresses as expected. However, the clients are not getting the DNS server address and the domain name information configured in the DHCP pool. What could be the cause of the problem?

The DNS server address is not on the same network as the clients are on.

The clients cannot communicate with the DHCPv6 server, evidenced by the number of active clients being 0.

The GigabitEthernet interface is not activated.

The router is configured for SLAAC DHCPv6 operation.*

20

A host on the 10.10.100.0/24 LAN is not being assigned an IPv4 address by an enterprise DHCP server with the address 10.10.200.10/24. What is the best way for the network engineer to resolve this problem?

Issue the command ip helper-address 10.10.100.0 on the router interface that is the 10.10.200.0/24 gateway.

Issue the command default-router 10.10.200.10 at the DHCP configuration prompt on the 10.10.100.0/24 LAN gateway router.

Issue the command ip helper-address 10.10.200.10 on the router interface that is the 10.10.100.0/24 gateway.*

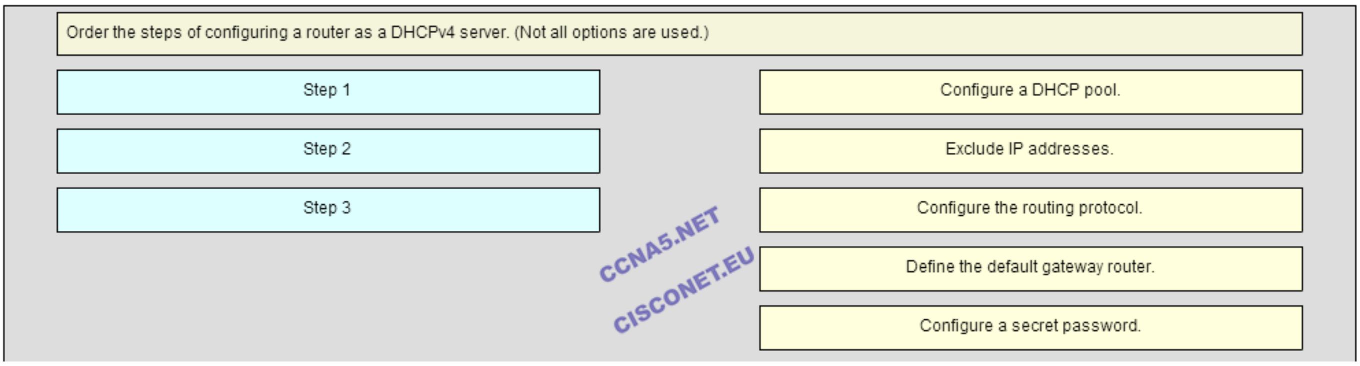
Issue the command network 10.10.200.0 255.255.255.0 at the DHCP configuration prompt on the 10.10.100.0/24 LAN gateway router.

21

Which is a DHCPv4 address allocation method that assigns IPv4 addresses for a limited lease period?

pre-allocation
manual allocation
automatic allocation
dynamic allocation*

22



Order the steps of configuring a router as a DHCPv4 server. (Not all options are used.)

Step 1	Configure a DHCP pool.
Step 2	Exclude IP addresses.
Step 3	Configure the routing protocol.
	Define the default gateway router.
	Configure a secret password.

Place the options in the following order:
[+] Step 2
[+] Step 1
– not scored –
[+] Step 3
– not scored -

[+] Order does not matter within this group.

23

An administrator wants to configure hosts to automatically assign IPv6 addresses to themselves by the use of Router Advertisement messages, but also to obtain the DNS server address from a DHCPv6 server. Which address assignment method should be configured?

RA and EUI-64
stateful DHCPv6
stateless DHCPv6*
SLAAC

24

A company uses the method SLAAC to configure IPv6 addresses for the workstations of the employees. A network administrator configured the IPv6 address on the LAN interface of the router. The interface status is UP. However, the workstations on the LAN segment did not obtain the correct prefix and prefix length. What else should be configured on the router that is attached to the LAN segment for the workstations to obtain the information?

R1(config-if)# ipv6 nd other-config-flag

R1(config-if)# ipv6 enable

R1(config)# ipv6 dhcp pool <name of the pool>

R1(config)# ipv6 unicast-routing*

CCNA 2 Chapter 11 v5.0 Exam Answers 2013

1

Which version of NAT allows many hosts inside a private network to simultaneously use a single inside global address for connecting to the Internet?

dynamic NAT

port forwarding

PAT*

static NAT

2

What is the group of public IPv4 addresses used on a NAT-enabled router known as?

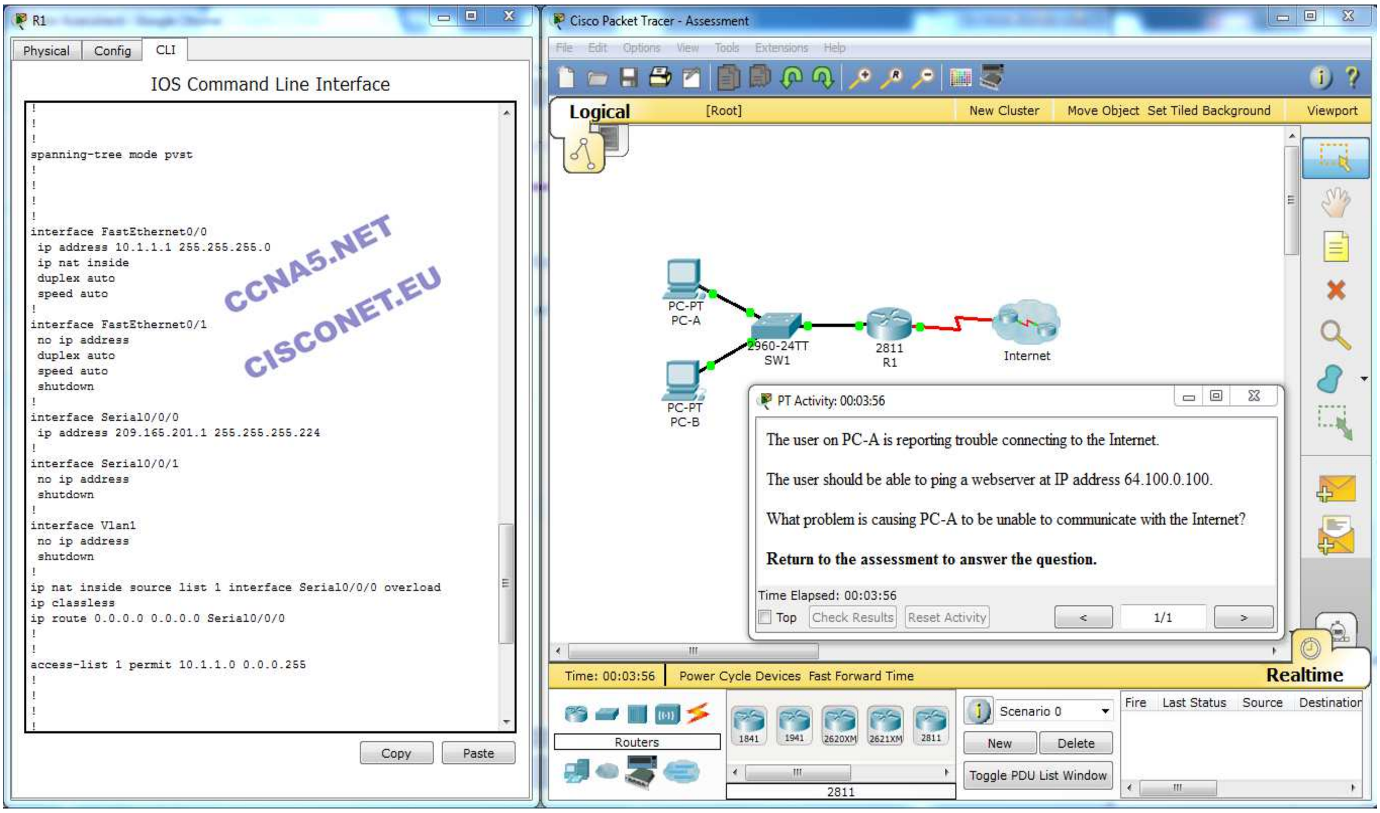
inside local addresses

outside global addresses

inside global addresses*

outside local addresses

3



```
!
!
!
spanning-tree mode pvst
!
!
!
!
interface FastEthernet0/0
 ip address 10.1.1.1 255.255.255.0
 ip nat inside
 duplex auto
 speed auto
!
interface FastEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 ip address 209.165.201.1 255.255.255.224
!
interface Serial0/0/1
 no ip address
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
ip nat inside source list 1 interface Serial0/0/0 overload
ip classless
ip route 0.0.0.0 0.0.0.0 Serial0/0/0
!
!
access-list 1 permit 10.1.1.0 0.0.0.255
!
!
!
!
```

The user on PC-A is reporting trouble connecting to the Internet.

The user should be able to ping a webserver at IP address 64.100.0.100.

What problem is causing PC-A to be unable to communicate with the Internet?

Return to the assessment to answer the question.

Launch PT Hide and Save PT

Open the PT Activity. Perform the tasks in the activity instructions and then answer the question.

What problem is causing PC-A to be unable to communicate with the Internet?

The access list used in the NAT process is referencing the wrong subnet.
The static route should not reference the interface, but the outside address instead.
The NAT interfaces are not correctly assigned.*
This router should be configured to use static NAT instead of PAT.
The ip nat inside source command refers to the wrong interface.

4
What is a disadvantage of NAT?

There is no end-to-end addressing.*
The internal hosts have to use a single public IPv4 address for external communication.
The router does not need to alter the checksum of the IPv4 packets.
The costs of readdressing hosts can be significant for a publicly addressed network.

5
Which statement accurately describes dynamic NAT?

It provides a mapping of internal host names to IP addresses.
It always maps a private IP address to a public IP address.
It provides an automated mapping of inside local to inside global IP addresses.*
It dynamically provides IP addressing to internal hosts.

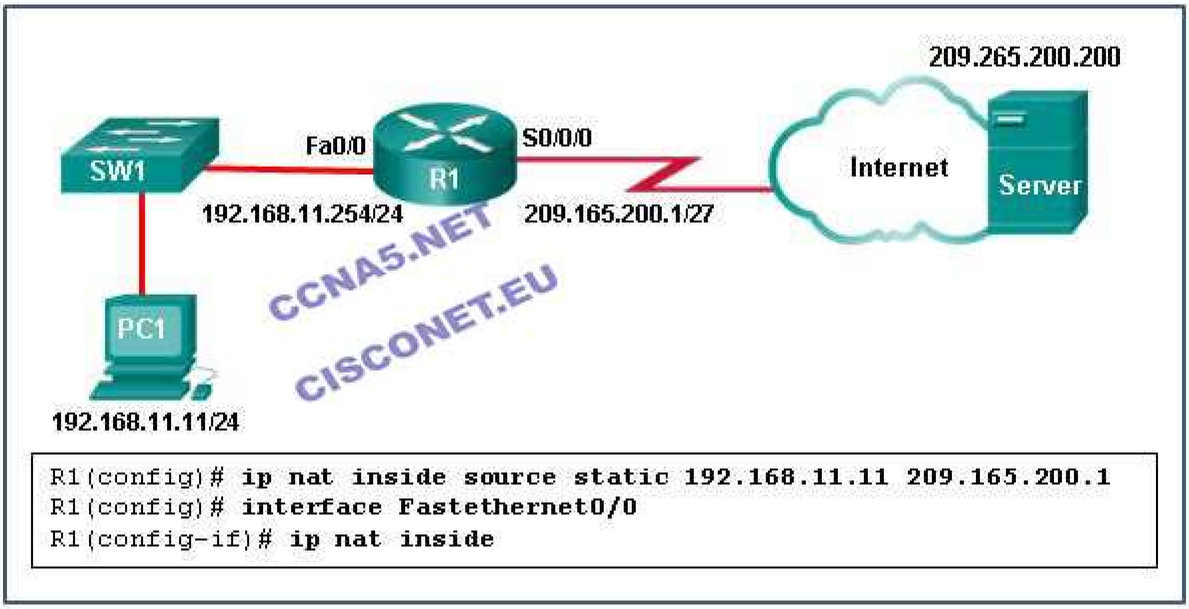
6
When dynamic NAT without overloading is being used, what happens if seven users attempt to access a public server on the Internet when only six addresses are available in the NAT pool?

All users can access the server.
The first user gets disconnected when the seventh user makes the request.
The request to the server for the seventh user fails.*
No users can access the server.

7
What is the purpose of port forwarding?

Port forwarding allows an external user to reach a service on a private IPv4 address that is located inside a LAN.*
Port forwarding allows users to reach servers on the Internet that are not using standard port numbers.
Port forwarding allows an internal user to reach a service on a public IPv4 address that is located outside a LAN.
Port forwarding allows for translating inside local IP addresses to outside local addresses.

8



```
R1(config)# ip nat inside source static 192.168.11.11 209.165.200.1
R1(config)# interface Fastethernet0/0
R1(config-if)# ip nat inside
```

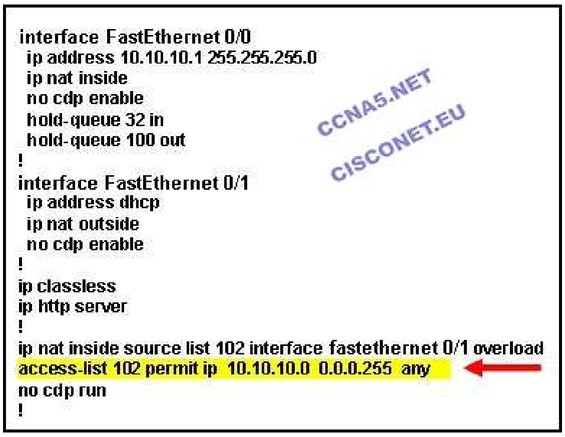
Refer to the exhibit. What has to be done in order to complete the static NAT configuration on R1?

R1 should be configured with the command ip nat inside source static 209.165.200.1 192.168.11.11.
R1 should be configured with the command ip nat inside source static 209.165.200.200 192.168.11.11.
Interface S0/0/0 should be configured with the command ip nat outside.*
Interface Fa0/0 should be configured with the command no ip nat inside.

9
When NAT is employed in a small office, which address type is typically used for hosts on the local LAN?

Internet-routable addresses
both private and public IP addresses
private IP addresses*
global public IP addresses

10



```
interface FastEthernet 0/0
 ip address 10.10.10.1 255.255.255.0
 ip nat inside
 no cdp enable
 hold-queue 32 in
 hold-queue 100 out
!
interface FastEthernet 0/1
 ip address dhcp
 ip nat outside
 no cdp enable
!
ip classless
ip http server
!
ip nat inside source list 102 interface fastethernet 0/1 overload
access-list 102 permit ip  10.10.10.0  0.0.0.255  any
no cdp run
!
```

Refer to the exhibit. What is the purpose of the command marked with an arrow shown in the partial configuration output of a Cisco broadband router?

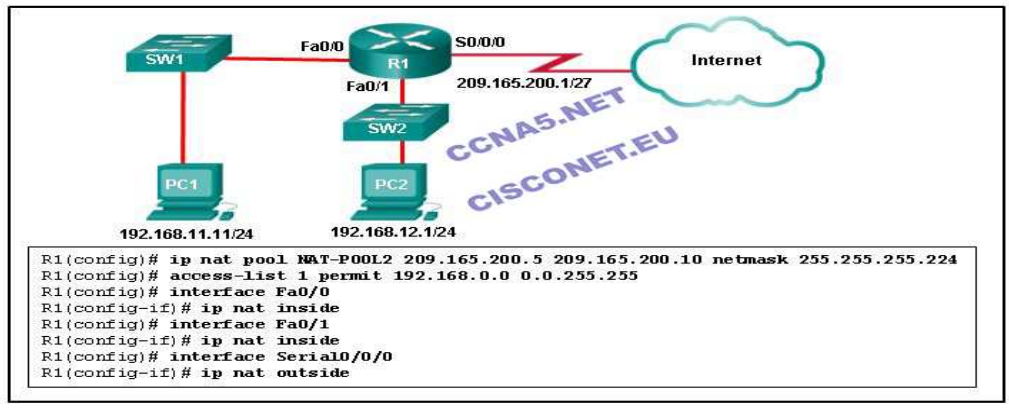
defines which addresses can be translated*
defines which addresses are allowed into the router
defines which addresses are assigned to a NAT pool
defines which addresses are allowed out of the router

11

A network administrator configures the border router with the command R1(config)# ip nat inside source list 4 pool corp. What is required to be configured in order for this particular command to be functional?

a VLAN named corp to be enabled and active and routed by R1
an access list named corp that defines the private addresses that are affected by NAT
ip nat outside to be enabled on the interface that connects to the LAN affected by the NAT
an access list numbered 4 that defines the starting and ending public IP addresses
a NAT pool named corp that defines the starting and ending public IP addresses*

12



```
R1(config)# ip nat pool NAT-POOL2 209.165.200.5 209.165.200.10 netmask 255.255.255.224
R1(config)# access-list 1 permit 192.168.0.0 0.0.255.255
R1(config)# interface Fa0/0
R1(config-if)# ip nat inside
R1(config)# interface Fa0/1
R1(config-if)# ip nat inside
R1(config)# interface Serial0/0/0
R1(config-if)# ip nat outside
```

Refer to the exhibit. R1 is configured for NAT as displayed. What is wrong with the configuration?

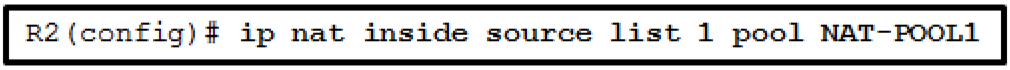
Access-list 1 is misconfigured.
NAT-POOL2 is not bound to ACL 1.*
Interface Fa0/0 should be identified as an outside NAT interface.
The NAT pool is incorrect.

13

A network engineer has configured a router with the command ip nat inside source list 4 pool corp overload. Why did the engineer use the overload option?

The company needs to have more public IP addresses available to be used on the Internet.
The company has a small number of servers that should be accessible by clients from the Internet.
The company has more private IP addresses than available public IP addresses.*
The company router must throttle or buffer traffic because the processing power of the router is not enough to handle the normal load of external-bound Internet traffic.

14



```
R2(config)# ip nat inside source list 1 pool NAT-POOL1
```

Refer to the exhibit. What will be the effect of entering the command that is shown in the exhibit on R2 as part of the dynamic NAT configuration?

It will bind NAT-POOL1 with ACL 1.*
It will identify an inside NAT interface.
It will define a pool of addresses for translation.
It will define the source ACL for the external interface.

15
Which configuration would be appropriate for a small business that has the public IP address of 209.165.200.225/30 assigned to the external interface on the router that connects to the Internet?

access-list 1 permit 10.0.0.0 0.255.255.255
ip nat pool comp 192.0.2.1 192.0.2.8 netmask 255.255.255.240
ip nat inside source list 1 pool comp overload

access-list 1 permit 10.0.0.0 0.255.255.255
ip nat pool comp 192.0.2.1 192.0.2.8 netmask 255.255.255.240
ip nat inside source list 1 pool comp overload
ip nat inside source static 10.0.0.5 209.165.200.225

access-list 1 permit 10.0.0.0 0.255.255.255
ip nat pool comp 192.0.2.1 192.0.2.8 netmask 255.255.255.240
ip nat inside source list 1 pool comp

access-list 1 permit 10.0.0.0 0.255.255.255
ip nat inside source list 1 interface serial 0/0/0 overload ******

16
Which type of NAT maps a single inside local address to a single inside global address?

dynamic
port address translation
static*
overloading

17

Typically, which network device would be used to perform NAT for a corporate environment?

host device

router*

DHCP server

server

switch

18

Several key servers in an organization must be directly accessible from the Internet. What addressing policy should be implemented for these servers?

Use dynamic NAT to provide addresses for the servers.

Place all of the servers in their own Class C private subnet.

Use DHCP to assign addresses from the pool of Class B addresses.

Assign static internal addresses and public external addresses to each of the servers.*

19

What is a characteristic of unique local addresses?

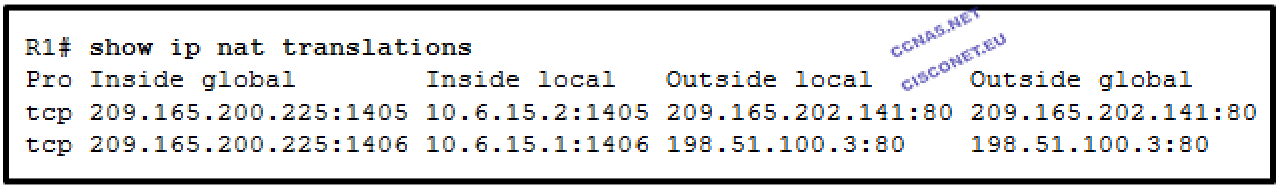
They are designed to improve the security of IPv6 networks.

Their implementation depends on ISPs providing the service.

They allow sites to be combined without creating any address conflicts.*

They are defined in RFC 3927.

20



```
R1# show ip nat translations
Pro Inside global         Inside local       Outside local        Outside global
tcp 209.165.200.225:1405 10.6.15.2:1405 209.165.202.141:80 209.165.202.141:80
tcp 209.165.200.225:1406 10.6.15.1:1406 198.51.100.3:80    198.51.100.3:80
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. Based on the output that is shown, what type of NAT has been implemented?

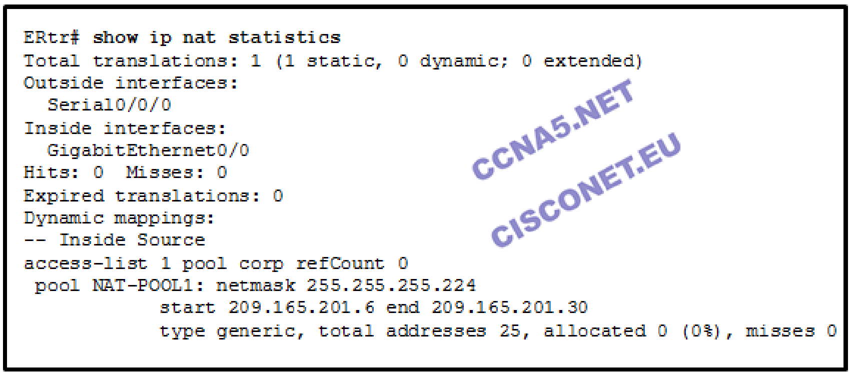
static NAT with a NAT pool

PAT using an external interface*

static NAT with one entry

dynamic NAT with a pool of two public IP addresses

21



```
ERtr# show ip nat statistics
Total translations: 1 (1 static, 0 dynamic; 0 extended)
Outside interfaces:
  Serial0/0/0
Inside interfaces:
  GigabitEthernet0/0
Hits: 0  Misses: 0
Expired translations: 0
Dynamic mappings:
-- Inside Source
access-list 1 pool corp refCount 0
 pool NAT-POOL1: netmask 255.255.255.224
            start 209.165.201.6 end 209.165.201.30
            type generic, total addresses 25, allocated 0 (0%), misses 0
```

CCNA5.NET
CISCONET.EU

Refer to the exhibit. The NAT configuration applied to the router is as follows:

ERtr(config)# access-list 1 permit 10.0.0.0 0.255.255.255

ERtr(config)# ip nat pool corp 209.165.201.6 209.165.201.30 netmask 255.255.255.224

ERtr(config)# ip nat inside source list 1 pool corp overload

ERtr(config)# ip nat inside source static 10.10.10.55 209.165.201.4

ERtr(config)# interface gigabitethernet 0/0

ERtr(config-if)# ip nat inside

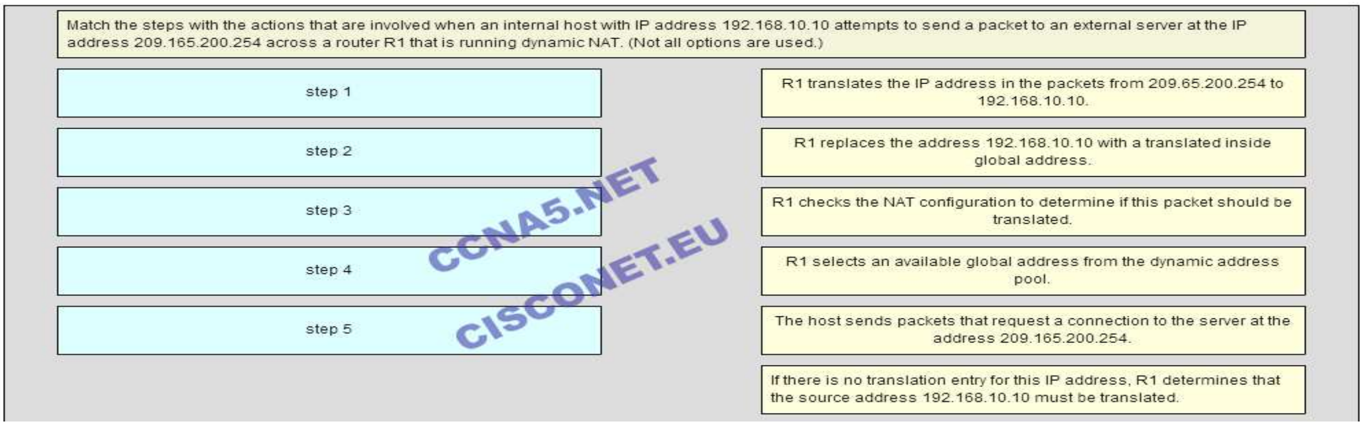
ERtr(config-if)# interface serial 0/0/0

ERtr(config-if)# ip nat outside

Based on the configuration and the output shown, what can be determined about the NAT status within the organization?

Static NAT is working, but dynamic NAT is not.
NAT is working.
Not enough information is given to determine if both static and dynamic NAT are working.*
Dynamic NAT is working, but static NAT is not.

22



Match the steps with the actions that are involved when an internal host with IP address 192.168.10.10 attempts to send a packet to an external server at the IP address 209.165.200.254 across a router R1 that is running dynamic NAT. (Not all options are used.)

step 1
step 2
step 3
step 4
step 5

R1 translates the IP address in the packets from 209.65.200.254 to 192.168.10.10.
R1 replaces the address 192.168.10.10 with a translated inside global address.
R1 checks the NAT configuration to determine if this packet should be translated.
R1 selects an available global address from the dynamic address pool.
The host sends packets that request a connection to the server at the address 209.165.200.254.
If there is no translation entry for this IP address, R1 determines that the source address 192.168.10.10 must be translated.

CCNA5.NET
CISCONET.EU

Place the options in the following order:

- not scored –

step 5

step 2

step 4

step 1

step 3

23

What are two required steps to configure PAT? (Choose two.)

Define the range of ports to be used.

Define a pool of global addresses to be used for overload translation.*

Identify the inside interface.*

Define a standard access list that allow the outside global addresses to be used.

Define a standard access list denying the addresses that should be translated.

CCNA 2 v5.0 R&S Essentials Final Exam 2014

1.
What are two features of a link-state routing protocol? (Choose two.)
The database information for each router is obtained from the same source.
Routers send triggered updates in response to a change.
Routers create a topology of the network by using information from other routers.
Paths are chosen based on the lowest number of hops to the designated router.
Routers send periodic updates only to neighboring routers.

2.
Fill in the blank.
In IPv6, all routes are level ” **1** ” ultimate routes.

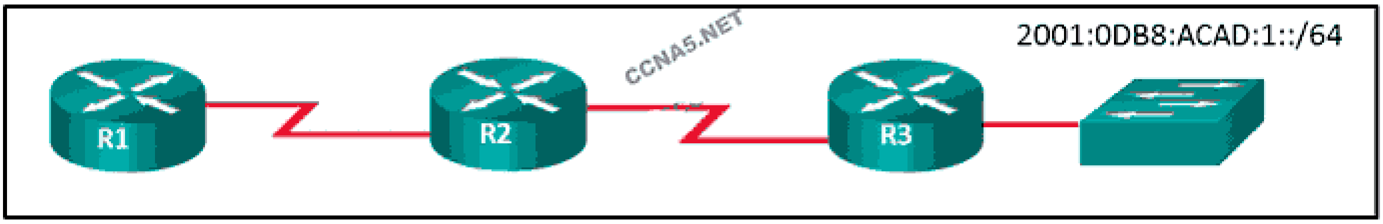
3.
Which switching method drops frames that fail the FCS check?

ingress port buffering
cut-through switching
store-and-forward switching
borderless switching

4.
Which summary IPv6 static route statement can be configured to summarize only the routes to networks 2001:db8:cafe::/58 through 2001:db8:cafe:c0::/58?

ipv6 route 2001:db8:cafe::/54 S0/0/0
ipv6 route 2001:db8:cafe::/60 S0/0/0
ipv6 route 2001:db8:cafe::/62 S0/0/0
ipv6 route 2001:db8:cafe::/56 S0/0/0

5.



Refer to the exhibit. If RIPng is enabled, how many hops away does R1 consider the 2001:0DB8:ACAD:1::/64 network to be?

1

3

4

2

6.
When a Cisco switch receives untagged frames on a 802.1Q trunk port, which VLAN ID is the traffic switched to by default?

data VLAN ID
native VLAN ID
unused VLAN ID
management VLAN ID

7.
A college marketing department has a networked storage device that uses the IP address 10.18.7.5, TCP port 443 for encryption, and UDP port 4365 for video streaming. The college already uses PAT on the router that connects to the Internet. The router interface has the public IP address of 209.165.200.225/30. The IP NAT pool currently uses the IP addresses ranging from 209.165.200.228-236. Which configuration would the network administrator add to allow this device to be accessed by the marketing personnel from home?

ip nat pool mktv 10.18.7.5 10.18.7.5

ip nat inside source static tcp 10.18.7.5 443 209.165.200.225 443
ip nat inside source static udp 10.18.7.5 4365 209.165.200.225 4365

ip nat inside source static tcp 209.165.200.225 443 10.18.7.5 443
ip nat inside source static udp 209.165.200.225 4365 10.18.7.5 4365

No additional configuration is necessary.

ip nat outside source static 10.18.7.5 209.165.200.225

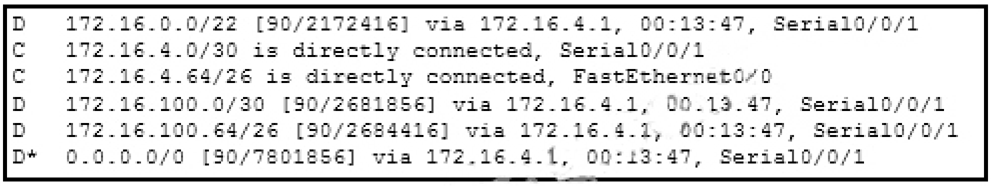
8.
Which statement describes a route that has been learned dynamically?

It is automatically updated and maintained by routing protocols.
It is unaffected by changes in the topology of the network.
It has an administrative distance of 1.
It is identified by the prefix C in the routing table.

9.
A network administrator is explaining to a junior colleague the use of the lt and gt keywords when filtering packets using an extended ACL. Where would the lt or gt keywords be used?

in an IPv6 extended ACL that stops packets going to one specific destination VLAN
in an IPv4 extended ACL that allows packets from a range of TCP ports destined for a specific network device
in an IPv4 named standard ACL that has specific UDP protocols that are allowed to be used on a specific server
in an IPv6 named ACL that permits FTP traffic from one particular LAN getting to another LAN

10

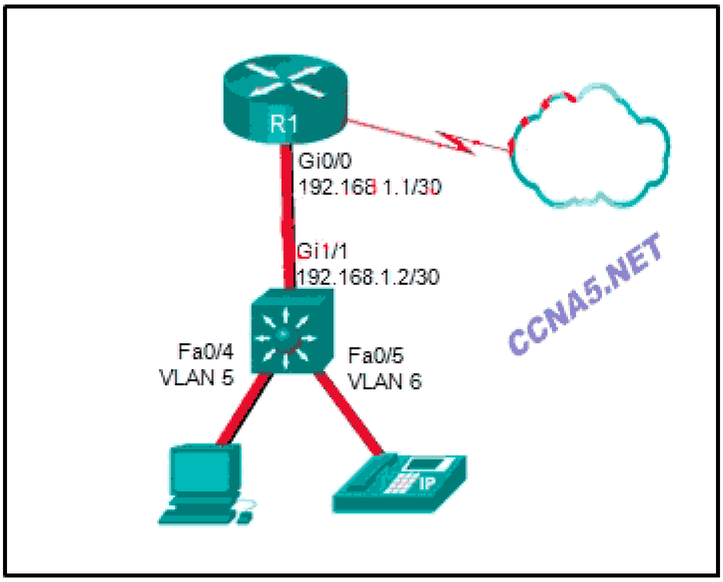


```
D    172.16.0.0/22 [90/2172416] via 172.16.4.1, 00:13:47, Serial0/0/1
C    172.16.4.0/30 is directly connected, Serial0/0/1
C    172.16.4.64/26 is directly connected, FastEthernet0/0
D    172.16.100.0/30 [90/2681856] via 172.16.4.1, 00.13.47, Serial0/0/1
D    172.16.100.64/26 [90/2684416] via 172.16.4.1, 00:13:47, Serial0/0/1
D*   0.0.0.0/0 [90/7801856] via 172.16.4.1, 00:13:47, Serial0/0/1
```

Refer to the exhibit. How did the router obtain the last route that is shown?

The ip address interface configuration mode command was used in addition to the network routing protocol configuration mode command.
The ipv6 route command was used.
the ip route command was used.
Another router in the same organization provided the default route by using a dynamic routing protocol.

11



Refer to the exhibit. A Layer 3 switch routes for three VLANs and connects to a router for Internet connectivity. Which two configurations would be applied to the switch? (Choose two.)

(config)# interface gigabitethernet 1/1
(config-if)# no switchport

(config-if)# ip address 192.168.1.2 255.255.255.252
(config)# interface vlan 1
(config-if)# ip address 192.168.1.2 255.255.255.0
(config-if)# no shutdown

(config)# interface gigabitethernet1/1
(config-if)# switchport mode trunk

(config)# interface fastethernet0/4
(config-if)# switchport mode trunk

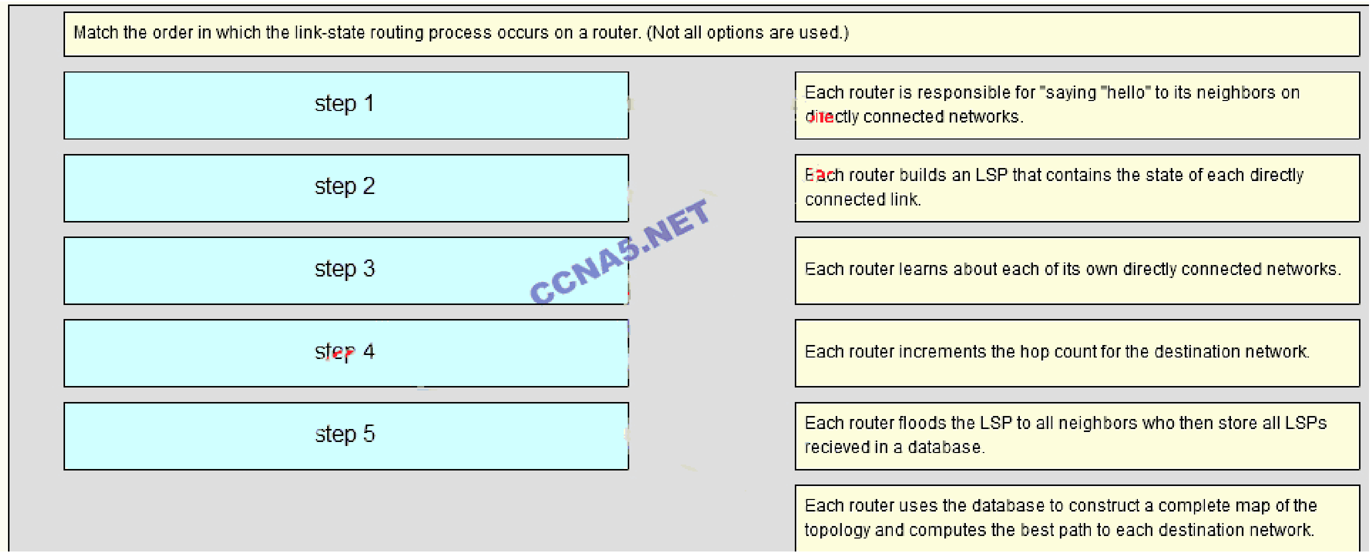
(config)# ip routing

12.

A network contains multiple VLANs spanning multiple switches. What happens when a device in VLAN 20 sends a broadcast Ethernet frame?

Only devices in VLAN 20 see the frame.
Devices in VLAN 20 and the management VLAN see the frame.
Only devices that are connected to the local switch see the frame.
All devices in all VLANs see the frame.

13



Match the order in which the link-state routing process occurs on a router. (Not all options are used.)

step 1	Each router is responsible for "saying "hello" to its neighbors on directly connected networks.
step 2	Each router builds an LSP that contains the state of each directly connected link.
step 3	Each router learns about each of its own directly connected networks.
step 4	Each router increments the hop count for the destination network.
step 5	Each router floods the LSP to all neighbors who then store all LSPs recieved in a database.
	Each router uses the database to construct a complete map of the topology and computes the best path to each destination network.

CCNA5.NET

the correct answer of question 13 is

1- Each router learns about its own directly connected networks.

2- Each router is responsible for “saying hello” to its neighbors on directly connected networks.

3- Each router builds a Link-State Packet (LSP) containing the state of each directly connected link

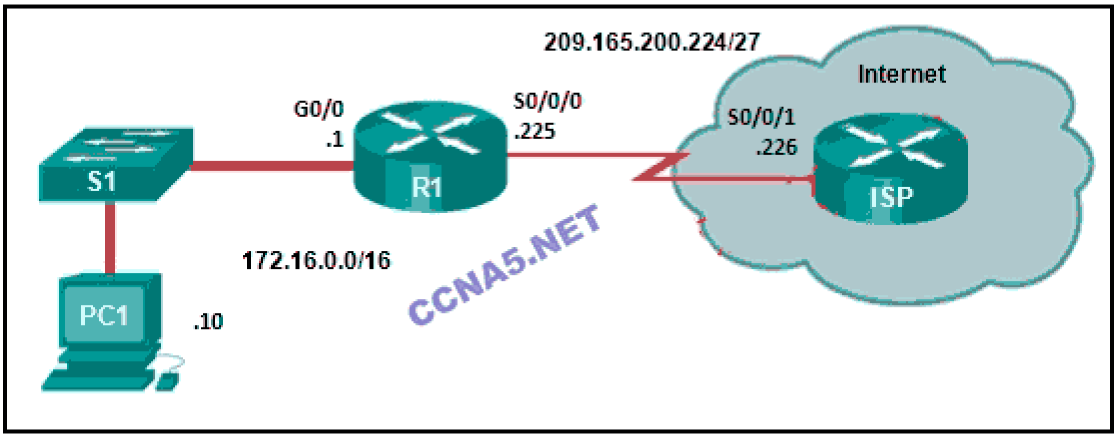
4- Each router floods the LSP to all neighbors, who then store all LSPs received in a database

5- Each router uses the database to construct a complete map of the topology and computes the best

14.

Which two packet filters could a network administrator use on an IPv4 extended ACL? (Choose two.)
computer type
source TCP hello address
ICMP message type
destination UDP port number
destination MAC address

15



Refer to the exhibit. R1 was configured with the static route command ip route 209.165.200.224 255.255.255.224 S0/0/0 and consequently users on network 172.16.0.0/16 are unable to reach resources on the Internet. How should this static route be changed to allow user traffic from the LAN to reach the Internet?
Add an administrative distance of 254.
Change the destination network and mask to 0.0.0.0 0.0.0.0
Change the exit interface to S0/0/1.
Add the next-hop neighbor address of 209.165.200.226.

16.
How is the router ID for an OSPFv3 router determined?

the highest IPv6 address on an active interface
the highest EUI-64 ID on an active interface
the highest IPv4 address on an active interface
the lowest MAC address on an active interface

17.
Two employees in the Sales department work different shifts with their laptop computers and share the same Ethernet port in the office. Which set of commands would allow only these two laptops to use the Ethernet port and create violation log entry without shutting down the port if a violation occurs?

switchport mode access
switchport port-security

switchport mode access
switchport port-security
switchport port-security maximum 2
switchport port-security mac-address sticky
switchport port-security violation restrict

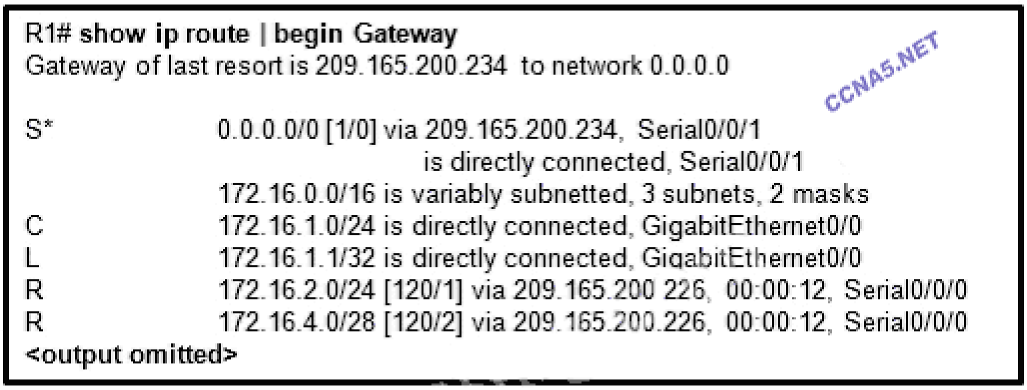
switchport mode access
switchport port-security maximum 2
switchport port-security mac-address sticky

switchport mode access
switchport port-security maximum 2
switchport port-security mac-address sticky
switchport port-security violation protect

18.
Which two factors are important when deciding which interior gateway routing protocol to use? (Choose two.)

speed of convergence
scalability
ISP selection
the autonomous system that is used
campus backbone architecture

19



```
R1# show ip route | begin Gateway
Gateway of last resort is 209.165.200.234  to network 0.0.0.0

S*                 0.0.0.0/0 [1/0] via 209.165.200.234,  Serial0/0/1
                                   is directly connected, Serial0/0/1
                   172.16.0.0/16 is variably subnetted, 3 subnets, 2 masks
C                  172.16.1.0/24 is directly connected, GigabitEthernet0/0
L                  172.16.1.1/32 is directly connected, GigabitEthernet0/0
R                  172.16.2.0/24 [120/1] via 209.165.200 226,  00:00:12, Serial0/0/0
R                  172.16.4.0/28 [120/2] via 209.165.200.226,  00:00:12, Serial0/0/0
<output omitted>
```

CCNA5.NET

Refer to the exhibit. Which type of route is 172.16.0.0/16?

ultimate route

child route

default route

level 1 parent route

20.
What caused the following error message to appear?

01:11:12: %PM-4-ERR_DISABLE: psecure-violation error detected on Fa0/8, putting Fa0/8 in err-disable state
01:11:12: %PORT_SECURITY-2-PSECURE_VIOLATION: Security violation occurred, caused by MAC address 0011.a0d4.12a0 on port FastEthernet0/8.
01:11:13: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/8, changed state to down
01:11:14: %LINK-3-UPDOWN: Interface FastEthernet0/8, changed state to down

An unauthorized user tried to telnet to the switch through switch port Fa0/8.
NAT was enabled on a router, and a private IP address arrived on switch port Fa0/8.
Port security was enabled on the switch port, and an unauthorized connection was made on switch port Fa0/8.
Another switch was connected to this switch port with the wrong cable.
A host with an invalid IP address was connected to a switch port that was previously unused.

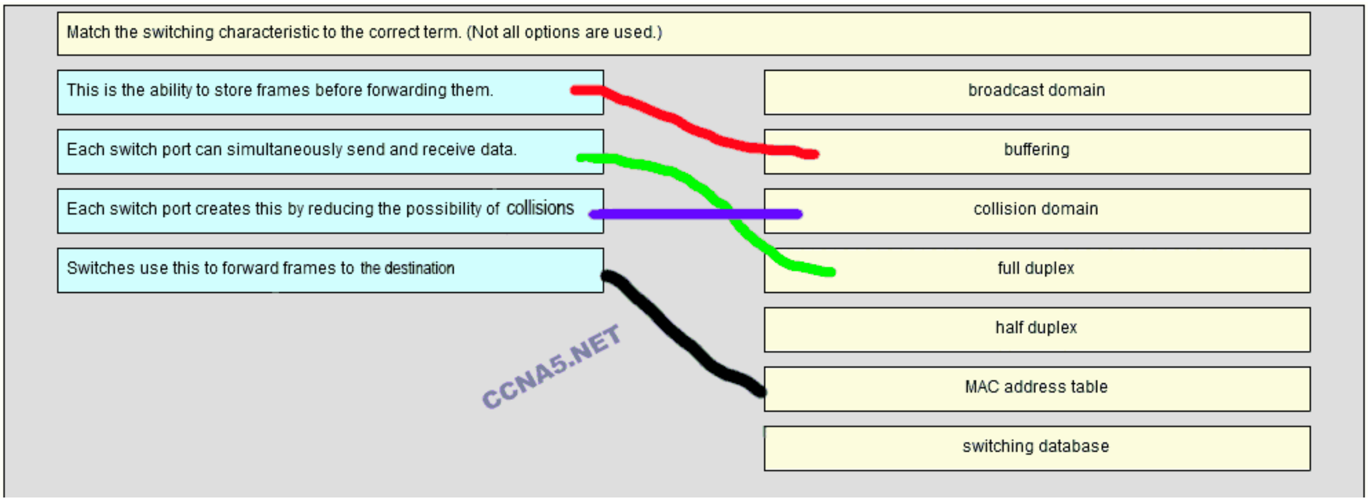
21.
Which two statements are characteristics of routed ports on a multilayer switch? (Choose two.)

In a switched network, they are mostly configured between switches at the core and distribution layers.
They support subinterfaces, like interfaces on the Cisco IOS routers.
The interface vlan command has to be entered to create a VLAN on routed ports.
They are used for point-to-multipoint links.
They are not associated with a particular VLAN.

22.
A network administrator is adding ACLs to a new IPv6 multirouter environment. Which IPv6 ACE is automatically added implicitly at the end of an ACL so that two adjacent routers can discover each other?

permit ip any host ip_address
permit icmp any any nd-na
permit ip any any
deny ip any any

23



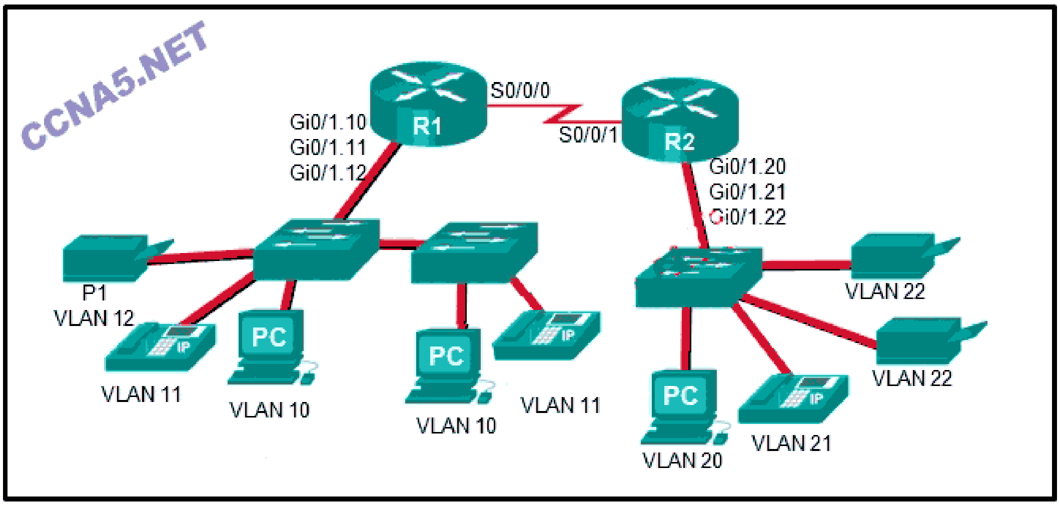
Match the switching characteristic to the correct term. (Not all options are used.)

This is the ability to store frames before forwarding them.
Each switch port can simultaneously send and receive data.
Each switch port creates this by reducing the possibility of collisions
Switches use this to forward frames to the destination

broadcast domain
buffering
collision domain
full duplex
half duplex
MAC address table
switching database

24.
What does the cost of an OSPF link indicate?
A lower cost indicates a better path to the destination than a higher cost does.
Cost equals bandwidth.
A higher cost for an OSPF link indicates a faster path to the destination.
Link cost indicates a proportion of the accumulated value of the route to the destination.

25



Refer to the exhibit. The Gigabit interfaces on both routers have been configured with subinterface numbers that match the VLAN numbers connected to them. PCs on VLAN 10 should be able to print to the P1 printer on VLAN 12. PCs on VLAN 20 should print to the printers on VLAN 22. What interface and in what direction should you place a standard ACL that allows printing to P1 from data VLAN 10, but stops the PCs on VLAN 20 from using the P1 printer? (Choose two.)

outbound
R2 S0/0/1
R1 S0/0/0
inbound
R1 Gi0/1.12
R2 Gi0/1.20

26.
On a switch that is configured with multiple VLANs, which command will remove only VLAN 100 from the switch?

Switch(config)# no vlan 100
Switch(config-if)# no switchport access vlan 100
Switch(config-if)# no switchport trunk allowed vlan 100
Switch# delete flash:vlan.dat

27.
A router needs to be configured to route within OSPF area 0. Which two commands are required to accomplish this? (Choose two.)

RouterA(config-router)# network 192.168.2.0 255.255.255.0 0
RouterA(config-router)# network 192.168.2.0 0.0.0.255 0
RouterA(config)# router ospf 1
RouterA(config-router)# network 192.168.2.0 0.0.0.255 area 0
RouterA(config)# router ospf 0

28.
What is a function of the distribution layer?

interconnection of large-scale networks in wiring closets
network access to the user
fault isolation
high-speed backbone connectivity

29.
A small-sized company has 20 workstations and 2 servers. The company has been assigned a group of IPv4 addresses 209.165.200.224/29 from its ISP. What technology should the company implement in order to allow the workstations to access the services over the Internet?

static NAT
dynamic NAT
port address translation
DHCP

30.
Which three requirements are necessary for two OSPFv2 routers to form an adjacency? (Choose three.)

The link interface subnet masks must match.
The two routers must include the inter-router link network in an OSPFv2 network command.
The OSPFv2 process ID must be the same on each router.

The OSPF hello or dead timers on each router must match.
The OSPFv2 process is enabled on the interface by entering the ospf process area-id command.
The link interface on each router must be configured with a link-local address.

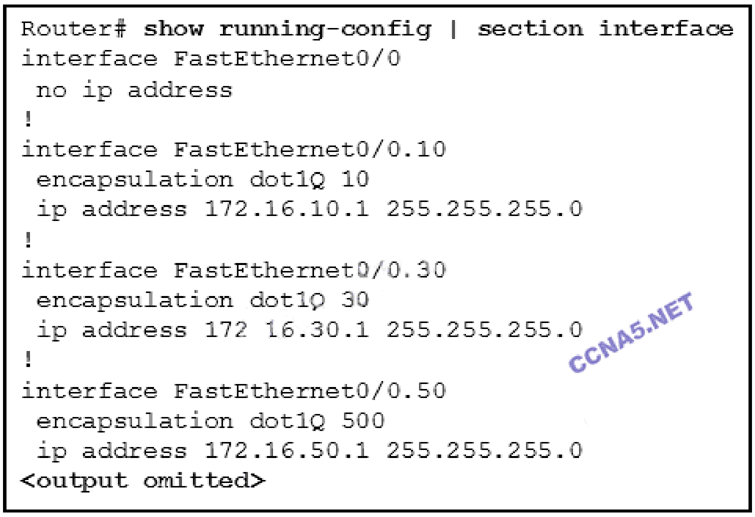
31.
Which three pieces of information does a link-state routing protocol use initially as link-state information for locally connected links? (Choose three.)

the cost of that link
the type of network link
the link bandwidth
the link next-hop IP address
the link router interface IP address and subnet mask

32.
What is a disadvantage of NAT?

The internal hosts have to use a single public IPv4 address for external communication.
There is no end-to-end addressing.
The costs of readdressing hosts can be significant for a publicly addressed network.
The router does not need to alter the checksum of the IPv4 packets.

33



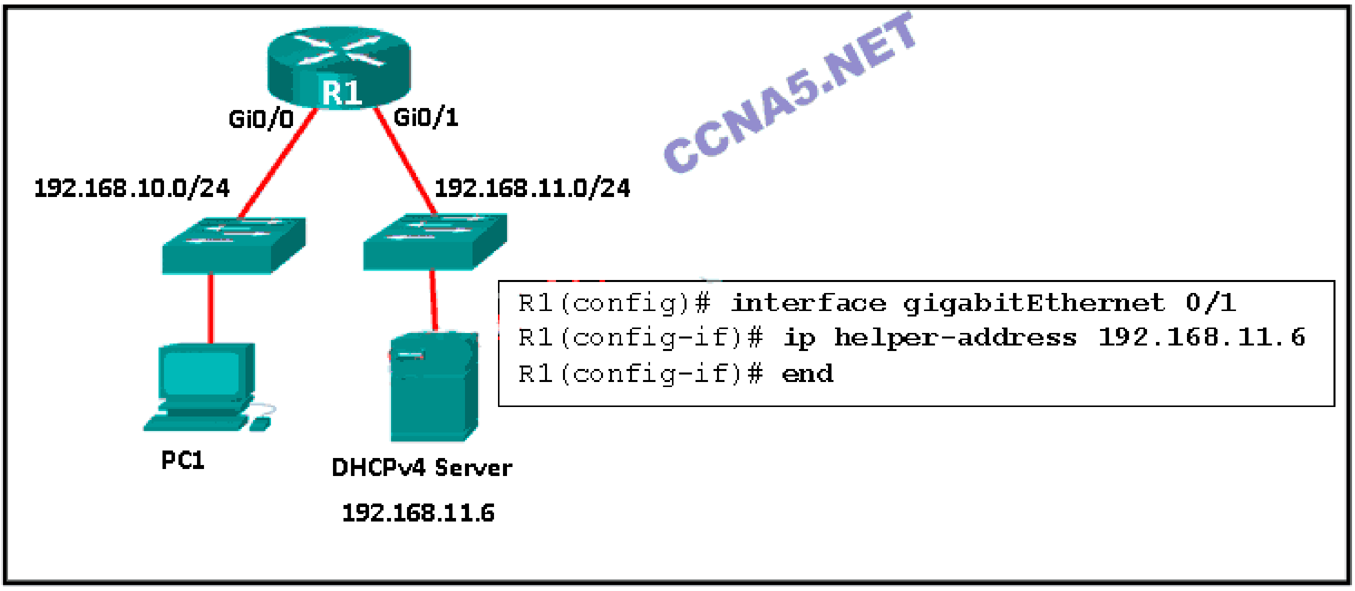
```
Router# show running-config | section interface
interface FastEthernet0/0
 no ip address
!
interface FastEthernet0/0.10
 encapsulation dot1Q 10
 ip address 172.16.10.1 255.255.255.0
!
interface FastEthernet0/0.30
 encapsulation dot1Q 30
 ip address 172 16.30.1 255.255.255.0
!
interface FastEthernet0/0.50
 encapsulation dot1Q 500
 ip address 172.16.50.1 255.255.255.0
<output omitted>
```

CCNA5.NET

Refer to the exhibit. The partial configuration that is shown was used to configure router on a stick for VLANS 10, 30, and 50. However, testing shows that there are some connectivity problems between the VLANs. Which configuration error is causing this problem?

There is no IP address configured for the FastEthernet 0/0 interface.
A configuration for the native VLAN is missing.
The wrong VLAN has been configured on subinterface Fa0/0.50.
The VLAN IP addresses should belong to the same subnet.

34



```
R1(config)# interface gigabitEthernet 0/1
R1(config-if)# ip helper-address 192.168.11.6
R1(config-if)# end
```

Refer to the exhibit. R1 has been configured as shown. However, PC1 is not able to receive an IPv4 address. What is the problem?

R1 is not configured as a DHCPv4 server.
A DHCP server must be installed on the same LAN as the host that is receiving the IP address.
The ip address dhcp command was not issued on the interface Gi0/1.
The ip helper-address command was applied on the wrong interface.

35.
What best describes the operation of distance vector routing protocols?

They use hop count as their only metric.
They send their routing tables to directly connected neighbors.
They flood the entire network with routing updates.
They only send out updates when a new network is added.

36.
A network administrator is using the router-on-a-stick method to configure inter-VLAN routing. Switch port Gi1/1 is used to connect to the router. Which command should be entered to prepare this port for the task?

Switch(config)# interface gigabitethernet 1/1
Switch(config-if)# spanning-tree vlan 1

Switch(config)# interface gigabitethernet 1/1
Switch(config-if)# spanning-tree portfast

Switch(config)# interface gigabitethernet 1/1
Switch(config-if)# switchport mode trunk

Switch(config)# interface gigabitethernet 1/1
Switch(config-if)# switchport access vlan 1

37.
Which three advantages are provided by static routing? (Choose three.)

The path a static route uses to send data is known.
No intervention is required to maintain changing route information.
Static routing does not advertise over the network, thus providing better security.
Static routing typically uses less network bandwidth and fewer CPU operations than dynamic routing does.
Configuration of static routes is error-free.
Static routes scale well as the network grows.

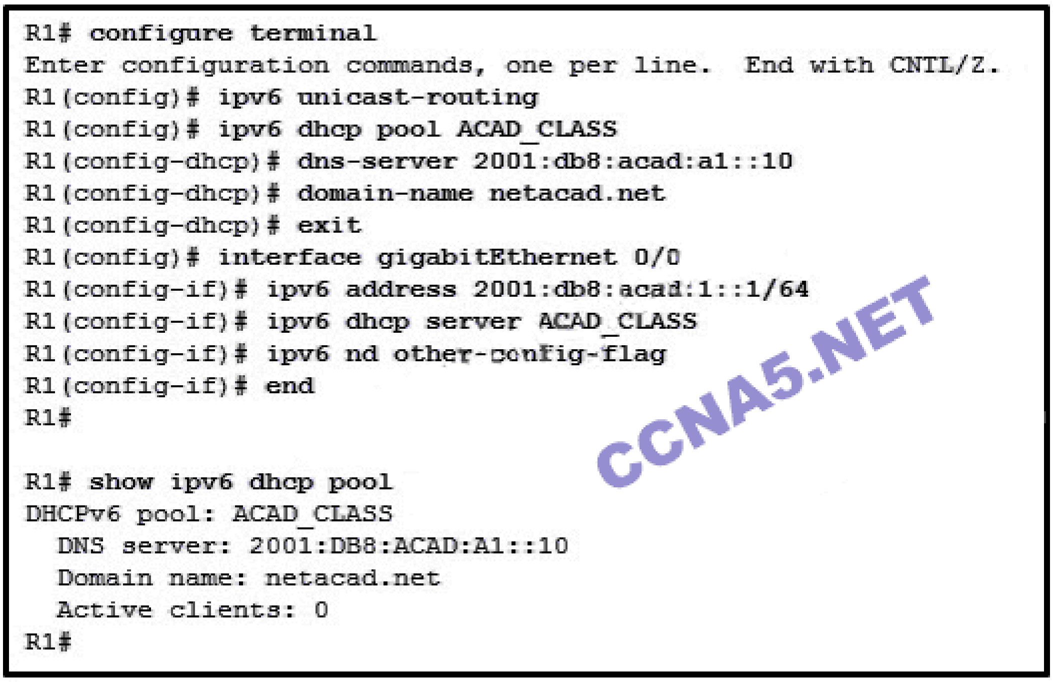
38.
When configuring a switch to use SSH for virtual terminal connections, what is the purpose of the crypto key generate rsa command?

show active SSH ports on the switch
disconnect SSH connected hosts
create a public and private key pair
show SSH connected hosts
access the SSH database configuration

39.
Which information does a switch use to populate the MAC address table?

the destination MAC address and the outgoing port
the source MAC address and the incoming port
the source and destination MAC addresses and the incoming port
the source MAC address and the outgoing port
the source and destination MAC addresses and the outgoing port
the destination MAC address and the incoming port

40



```
R1# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)# ipv6 unicast-routing
R1(config)# ipv6 dhcp pool ACAD_CLASS
R1(config-dhcp)# dns-server 2001:db8:acad:a1::10
R1(config-dhcp)# domain-name netacad.net
R1(config-dhcp)# exit
R1(config)# interface gigabitEthernet 0/0
R1(config-if)# ipv6 address 2001:db8:acad:1::1/64
R1(config-if)# ipv6 dhcp server ACAD_CLASS
R1(config-if)# ipv6 nd other-config-flag
R1(config-if)# end
R1#

R1# show ipv6 dhcp pool
DHCPv6 pool: ACAD_CLASS
  DNS server: 2001:DB8:ACAD:A1::10
  Domain name: netacad.net
  Active clients: 0
R1#
```

CCNA5.NET

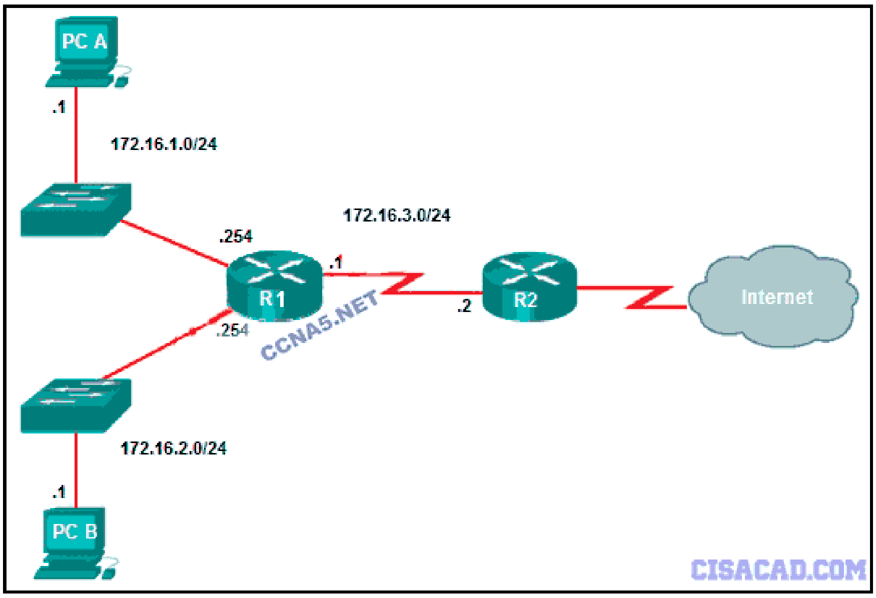
Refer to the exhibit. A network administrator is configuring a router as a DHCPv6 server. The administrator issues a show ipv6 dhcp pool command to verify the configuration. Which statement explains the reason that the number of active clients is 0?

The IPv6 DHCP pool configuration has no IPv6 address range specified.
The state is not maintained by the DHCPv6 server under stateless DHCPv6 operation.
The default gateway address is not provided in the pool.
No clients have communicated with the DHCPv6 server yet.

41.
Open the PT Activity. Perform the tasks in the activity instructions and then answer the question. What is the problem preventing PC0 and PC1 from communicating with PC2 and PC3?

The routers are using different OSPF process IDs.
The serial interfaces of the routers are in different subnets.
No router ID has been configured on the routers.
The gigabit interfaces are passive.

42



Which command will create a static route on R2 in order to reach PC B?

R1(config)# ip route 172.16.2.0 255.255.255.0 172.16.2.254
R1(config)# ip route 172.16.2.0 255.255.255.0 172.16.3.1
R1(config)# ip route 172.16.2.1 255.255.255.0 172.16.3.1
R1(config)# ip route 172.16.3.0 255.255.255.0 172.16.2.254

43.
Which problem is evident if the show ip interface command shows that the interface is down and the line protocol is down?

The no shutdown command has not been issued on the interface.
There is an IP address conflict with the configured address on the interface.
A cable has not been attached to the port.
An encapsulation mismatch has occurred.

44.
Which three values or sets of values are included when creating an extended access control list entry? (Choose three.)

access list number between 100 and 199
source subnet mask and wildcard mask
default gateway address and wildcard mask
source address and wildcard mask
destination subnet mask and wildcard mask
access list number between 1 and 99
destination address and wildcard mask

45.
A network administrator is designing an ACL. The networks 192.168.1.0/25, 192.168.0.0/25, 192.168.0.128/25, 192.168.1.128/26, and 192.168.1.192/26 are affected by the ACL. Which wildcard mask, if any, is the most efficient to use when specifying all of these networks in a single ACL permit entry?

0.0.0.127
0.0.0.255
0.0.1.255
0.0.255.255

A single ACL command and wildcard mask should not be used to specify these particular networks or other traffic will be permitted or denied and present a security risk.

46.
Which kind of message is sent by a DHCP client when its IP address lease has expired?

a DHCPREQUEST unicast message
a DHCPREQUEST broadcast message
a DHCPDISCOVER broadcast message
a DHCPDISCOVER unicast message

47.
What happens immediately after two OSPF routers have exchanged hello packets and have formed a neighbor adjacency?

They request more information about their databases.
They negotiate the election process if they are on a multiaccess network.
They exchange DBD packets in order to advertise parameters such as hello and dead intervals.
They exchange abbreviated lists of their LSDBs

48.
What benefit does NAT64 provide?

It allows sites to use private IPv4 addresses, and thus hides the internal addressing structure from hosts on public IPv4 networks.
It allows sites to connect multiple IPv4 hosts to the Internet via the use of a single public IPv4 address.
It allows sites to connect IPv6 hosts to an IPv4 network by translating the IPv6 addresses to IPv4 addresses.
It allows sites to use private IPv6 addresses and translates them to global IPv6 addresses.

49.

What is the purpose of setting the native VLAN separate from data VLANs?

The native VLAN is for routers and switches to exchange their management information, so it should be different from data VLANs.

A separate VLAN should be used to carry uncommon untagged frames to avoid bandwidth contention on data VLANs.

The native VLAN is for carrying VLAN management traffic only.

The security of management frames that are carried in the native VLAN can be enhanced

50.

Which command, when issued in the interface configuration mode of a router, enables the interface to acquire an IPv4 address automatically from an ISP, when that link to the ISP is enabled?

ip helper-address

ip address dhcp

ip dhcp pool

service dhcp

51.

Which statement is correct about IPv6 routing?

IPv6 routing is enabled by default on Cisco routers.

IPv6 routes appear in the same routing table as IPv4 routes.

IPv6 uses the link-local address of neighbors as the next-hop address for dynamic routes.

IPv6 only supports the OSPF and EIGRP routing protocols

52.

A router has used the OSPF protocol to learn a route to the 172.16.32.0/19 network. Which command will implement a backup floating static route to this network?

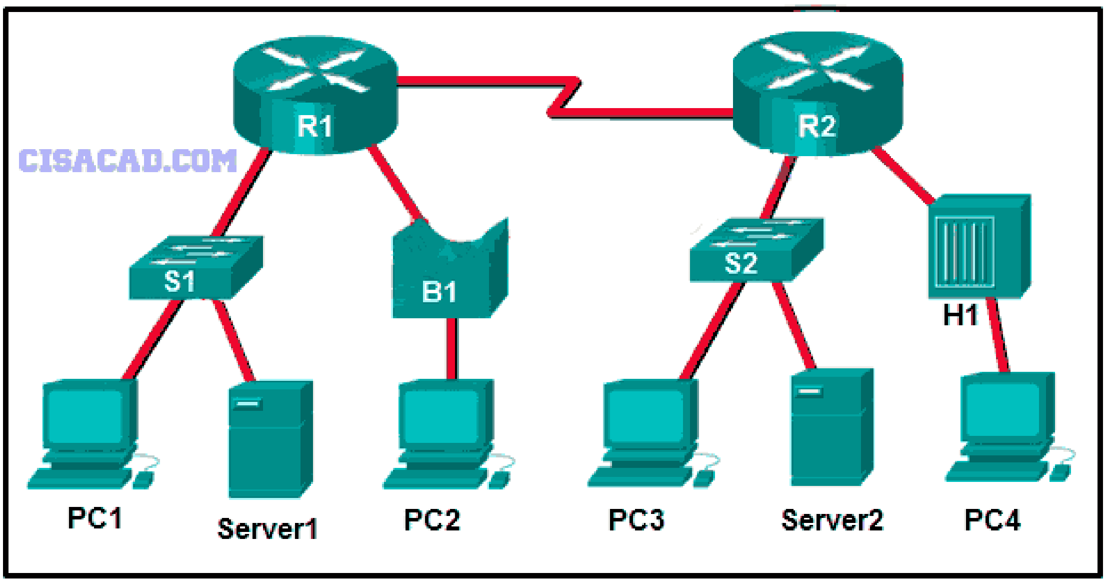
ip route 172.16.32.0 255.255.0.0 S0/0/0 100

ip route 172.16.32.0 255.255.224.0 S0/0/0 200

ip route 172.16.0.0 255.255.240.0 S0/0/0 200

ip route 172.16.0.0 255.255.224.0 S0/0/0 100

53



Refer to the exhibit. How many broadcast and collision domains exist in the topology?

5 broadcast domains and 11 collision domains
10 broadcast domains and 5 collision domains
16 broadcast domains and 11 collision domains
5 broadcast domains and 10 collision domains

54.
Which two commands can be used to verify the content and placement of access control lists? (Choose two.)

show processes
show cdp neighbor
show access-lists
show ip route
show running-config

55.
Which type of traffic would most likely have problems when passing through a NAT device?

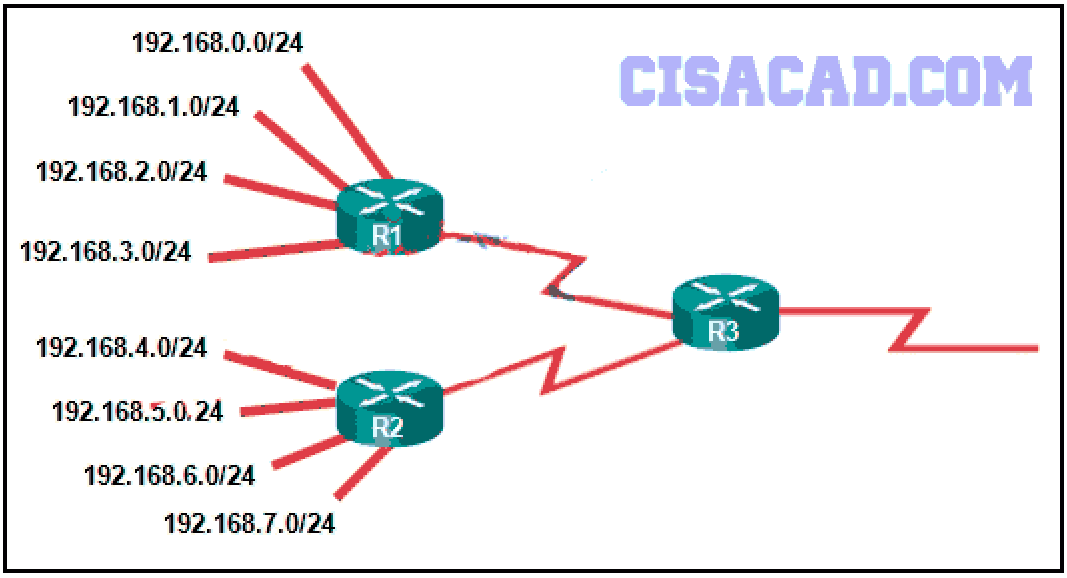
IPsec
DNS
Telnet
HTTP
ICMP

56.
Open the PT Activity. Perform the tasks in the activity instructions and then answer the question.

Which keyword is displayed on the web browser?

NAT works!
Goodjob!
Welldone!
NAT configured!

57



Refer to the exhibit.

What summary static address would be configured on R1 to advertise to R3?

192.168.0.0/24
192.168.0.0/23
192.168.0.0/22
192.168.0.0/21

58

Fill in the blank.
Static routes are configured by the use of the ” **ip route**” global configuration command.

Questions from Book

CISCO IT 257

m Class Activities

Class Activity 1.0.1.2: Sent or Received Instructions

Class Activity 1.3.1.1: It's Network Access Time

Packet Tracer Activities

Packet Tracer Activity1.3.1.3: Skills Integration Challenge

Check Your Understanding Questions

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. The appendix, "Answers to the 'Check Your Understanding' Questions," lists the answers.

1. Which three options correctly associate a layer of the hierarchical design model with the function of that layer? (Choose three.)
   - A. Core - end device connectivity
   - B. Distribution - aggregation and traffic control
   - C. Access - end device connectivity
   - D. Distribution - high speed backbone
   - E. Access - aggregation of traffic
   - F. Core - high speed backbone
2. Which hierarchical network design goal is to provide a way for the network to always be accessible?
   - A. hierarchical
   - B. modularity
   - C. resiliency
   - D. flexibility
3. Which two layers of the hierarchical network design model are commonly combined into a single layer in a small-to-medium sized network architecture? (Choose two.)

A. access
B. data link
C. network
D. distribution
E. application
F. core

4. What is convergence as it relates to network design?
   - A. Implementation of an access-distribution-core layer design model for all sites in a corporation

B. A centralized point in the network design where all traffic aggregates before transmission to the destination
C. The combining of voice and video with traditional network traffic
D. Designing a network in such a way that each tier has a specific function and upgrade path

5. What are three benefits of a converged network? (Choose three.)
   A. Voice and data support staff are combined.
   B. Network design is simplified.
   C. Network configuration is simplified.
   D. Voice, video, and data traffic use one physical network.
   E. Maintenance is simpler than hierarchical networks.
   F. Network moves, adds, and changes are simplified.
6. Which two terms are correctly defined? (Choose two.)
   A. Internal switching rate - processing capability of a switch that quantifies how much data it can process per second
   B. Port density - capability to use multiple switch ports concurrently for higher throughput data communication
   C. Rack unit - number of ports that can fit in a specific switch
   D. Cut-through switching - the transmission of a frame after the destination MAC address has been examined and processed
   E. Modular configuration switch - only support features or options that ship with the device
7. A switch that uses MAC addresses to forward frames operates at which layer of the OSI model?
   A. Layer 1
   B. Layer 2
   C. Layer 3
   D. Layer 4
8. A switch has just been powered on. PC1 connects to port 1; PC2 connects to port 2. If PC1 sends data to PC2, how will the switch process the frame?
   A. The switch forwards the frame based on the MAC address of PC2.
   B. The switch adds the MAC address of PC1 (that is received on the ingress port) to the switch MAC address table.
   C. The switch forwards the frame to all switch ports including ports 1 and 2.
   D. The switch adds the IP address of PC2 (that is sent through the egress port) to the switch MAC address table.
9. What function is most likely to be provided by a Cisco access layer switch?

A. PoE
B. Routing
C. Link aggregation
D. Fault isolation

10. Use the abbreviated MAC addresses in the MAC address table to determine the correct answer. A PC connected to port Gi0/3 sends data to a PC connected to port Gi0/5. When the switch receives the data, what will the switch do to process the frame?

PortMAC address

Gi0/3 AA Gi0/7 AB

A. Add the destination MAC address to the switch MAC address table.
B. Forward the data out all ports except for port Gi0/3.
C. Forward the data to port Gi0/3.
D. Forward the data out all ports.
E. Add both the source and destination MAC addresses to the switch MAC address table.

11. Use the abbreviated MAC addresses in the MAC address table to determine the correct answer. A PC connected to port Gi0/4 sends data to a PC connected to port Gi0/3. When the switch receives the data, what will the switch do first to process the frame?

PortMAC address

Gi0/3 AA Gi0/7 AB

A. Add the source MAC address to the switch MAC address table.
B. Forward the data out all ports except for port 4.
C. Forward the data to port 5.
D. Forward the data out all ports.
E. Add both the source and destination MAC addresses to the switch MAC address table.
F. Add the destination MAC address to the switch MAC address table.

Packet Tracer
□ **Activity**

Packet Tracer Activities

Packet Tracer Activity 2.2.1.4: Configuring SSH Packet Tracer Activity 2.2.4.9: Configuring Switch Port Security Packet Tracer Activity 2.2.4.10: Troubleshooting Switch Port Security Packet Tracer Activity 2.3.1.2: Skills Integration Challenge

Check Your Understanding Questions

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. The appendix, "Answers to the 'Check Your Understanding' Questions," lists the answers.

1. Which three options correctly associate the command with the paired behavior? (Choose three.)

   A. switchport port-security violation protect: Frames with unknown source addresses are dropped and a notification is sent.

   B. switchport port-security violation restrict: Frames with unknown source addresses are dropped and no notification is sent.

   C. switchport port-security violation shutdown: Frames with unknown source addresses result in the port becoming error-disabled, and a notification is sent.

   D. switchport port-security mac-address sticky: Allows dynamically learned MAC addresses to be stored in the running-configuration.

   E. switchport port-security maximum: Defines the number of MAC addresses associated with a port.

2. What is the effect of entering the following command on a Fast Ethernet switch port?

```
SWl(config-if)# duplex full
```

   A. The connected device communicates in two directions, but only one direction at a time.

   B. The switch port returns to its default configuration.

   C. If the device connected to this port is also set for full duplex, the device participates in collision-free communication.

   D. The efficiency of this configuration is typically rated at 50 to 60 percent.

   E. The connected device should be configured as half duplex.

3. Which two tasks does autonegotiation in an Ethernet network accomplish? (Choose two.)
   A. Sets the link speed
   B. Sets the IP address
   C. Sets the link duplex mode
   D. Sets MAC address assignments on switch port
   E. Sets the ring speed

4. Why should a default gateway be assigned to a switch?
   A. So that there can be remote connectivity to the switch via such programs as Telnet and ping
   B. So that frames can be sent through the switch to the router
   C. So that frames generated from workstations and destined for remote networks can pass to a higher level
   D. So that other networks can be accessed from the command prompt of the switch

5. The network administrator wants to configure an IP address on a Cisco switch. How does the network administrator assign the IP address?
   A. In privileged EXEC mode
   B. On the switch interface FastEthernet0/0
   C. On the management VLAN
   D. On the physical interface connected to the router or next-hop device

6. Which option correctly associates the Layer 2 security attack with the description?
   A. MAC address flooding: Broadcast requests for IP addresses with spoofed MAC addresses.
   B. DHCP starvation: Using proprietary Cisco protocols to gain information about a switch.
   C. CDP attack: The attacker fills the switch MAC address table with invalid MAC addresses.
   D. Telnet attack: Using brute force password attacks to gain access to a switch.

7. What is an advantage of using SSH over Telnet when remotely connecting to a switch?
   A. Encryption
   B. More connection lines
   C. Connection-oriented services
   D. Username and password authentication

8. Consider the configuration. Which two commands are not needed on the switch in order for a remote network administrator to access the switch using SSH?
   A. Switch(config)# **`ip domain-name mydomain.com`**
   B. Switch(config)#**`crypto key generate rsa`**
   C. Switch(config)# **`ip ssh version 2`**
   D. Switch(config)#**`line vty 0 15`**
   E. Switch(config-if)# **`transport input ssh`**

9. What is an advantage of having the correct date and time on a network device?
   A. Network administrators are provided with correct timestamps on log messages.
   B. When working at the console prompt, the network administrator has a good idea how long the configuration or troubleshooting process is taking.
   C. Other devices can use CDP to discover neighbor device information if the time and date are synchronized between the two devices.
   D. Secure remote connectivity can be accomplished if the date and time are accurate.

10. What is the purpose of DHCP snooping?
    A. Ensures devices are configured for automatic IP address assignment
    B. Prevents unauthorized DHCP servers
    C. Prevents DHCP messages from going across a trunk
    D. Prevents DHCP messages from being sent to another network

11. What is a Cisco best practice for deploying switches?
    A. When a server connects to a switch, the switch port should have the port speed manually configured, but the autonegotiation feature used for duplex.
    B. A compound word should be used as a password on an infrastructure network device such as a switch.
    C. Telnet should be used whenever possible on the switch vty lines.
    D. The enable secret password should be used when configuring a switch to use SSH on the vty lines.

12. When would auto-MDIX be best to use?
    A. When a switch connects to a router
    B. When a switch connects to another switch
    C. When any device connects to an access layer switch
    D. When the cable type is unknown

Packet Tracer
□ **Activity**

Packet Tracer Activities

Packet Tracer Activity 3.1.1.5: Who Hears the Broadcast?

Packet Tracer Activity 3.1.2.7: Investigating a VLAN Implementation Packet

Tracer Activity 3.2.1.6: Configuring VLANs Packet Tracer Activity 3.2.2.4:

Configuring Trunks

Packet Tracer Activity 3.2.4.7: Troubleshooting a VLAN Implementation: Scenario 1 Packet

Tracer Activity 3.2.4.8: Troubleshooting a VLAN Implementation: Scenario 2 Packet Tracer

Activity 3.4.1.2: Skills Integration Challenge

Check Your Understanding Questions

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. The appendix, "Answers to the 'Check Your Understanding' Questions," lists the answers.

1. What is the difference between an access port and a trunk port?

A. A trunk port belongs to a single VLAN; an access port provides access for multiple VLANs between switches.

B. An access port can have a native VLAN, but a trunk port cannot.

C. An access port can have only one device attached.

D. Multiple VLANs traverse a trunk port, but an access port can belong to a single VLAN.

2. Switch S1 and Switch S2 are both configured with ports in the Faculty, Students, Voice, Guest, Printing, and Admin VLANs. Each VLAN contains 12 users. How many subnets are needed to address the VLANs?

A. 1

B. 2

C. 4

D. 6

E. 8

F. 12

G. 24

3. What mechanism is used to achieve the separation between different VLANs as they cross a trunk link?

A. VLAN tagging using 802.1Q protocol

B. VLAN tagging using 802.1p protocol

C. VLAN multiplexing

D. VLAN set as a native VLAN

4. What are two options to consider when configuring a trunk link between two switches? (Choose two.)

A. The switchport nonegotiate command must be configured for trunks that use DTP.

B. Port security cannot be configured on the trunk interfaces.

C. The native VLAN must be the same on both ends of the trunk.

D. Different encapsulation types can be configured on both ends of the trunk link.

E. Trunk ports can be configured only on Gigabit Ethernet interfaces.

5. A 24-port switch has been configured to support three VLANs named Sales, Marketing, and Finance. Each VLAN spans four ports on the switch. The network administrator has deleted the Marketing VLAN from the switch. What two statements describe the status of the ports associated with this VLAN? (Choose two.)

A. The ports are inactive.

B. The ports are administratively disabled.

C. The ports will become trunks to carry data from all remaining VLANs.

D. The ports will remain part of the Marketing VLAN until reassigned to another VLAN.

E. The ports were released from the Marketing VLAN and automatically reassigned to VLAN 1.

6. Which three statements are true about hosts that are configured in the same VLAN? (Choose three.)

A. Hosts in the same VLAN must be on the same IP subnet.

B. Hosts in different VLANs can communicate with the aid of only the Layer 2 switch.

C. Hosts in the same VLAN share the same broadcast domain.

D. Hosts in the same VLAN share the same collision domain.

E. Hosts in the same VLAN comply with the same security policy.

F. Hosts in the same VLAN must be on the same physical segment.

7. Refer to Figure 3-8. Host PC3 is unable to transfer data because it does not have the MAC address of the destination host. If PC3 sends out an ARP request broadcast, which of the other hosts will see the message?

A. Only PC3

B. Only PC4

C. Only PC4 and PC5

D. PC1, PC2, PC4, and PC5

E. PC1, PC2, PC3, PC4, and PC5

8. With each listed characteristic on the right, indicate in the blank on the left whether it reflects a normal range VLAN, an extended range VLAN, or VLAN 1. Use N for normal range VLAN, E for extended range VLAN, and 1 for VLAN 1.

____1-1005

____1006-4094

____Stored in vlan.dat

____Default management VLAN

____Default native VLAN

____All ports are a member of by default

____Stored in running configuration file

9. Refer to the following configuration. Host 1 is connected to interface Fa0/4 with IP address 192.168.1.22/28. Host 2 is connected to interface Fa0/5 with IP address 192.168.1.33/28. Host 3 is connected to interface F0/6 with IP address 192.168.1.30/28. Select the three statements that describe the success of pinging from one host to another. (Choose three.)

```
Switch(config)# vlan 10
Switch(config-vlan)# name Faculty
Switch(config-vlan)# vlan 20
Switch(config-vlan)# name Staff
Switch(config-vlan)# interface range fa0/4 , fa0/6
Switch(config-if-range)# switchport mode access
Switch(config-if-range)# switchport access vlan 10
Switch(config-if-range)# interface fa0/5
Switch(config-if)# switchport mode access
Switch(config-if)# switchport access vlan 20
```

A. Host 1 can ping Host 2.

B. Host 1 cannot ping Host 2.

C. Host 1 can ping Host 3.

D. Host 1 cannot ping Host 3.

E. Host 2 can ping Host 3.

F. Host 2 cannot ping Host 3.

10. Which three options accurately associate the Catalyst switch command with the result?

(Choose three.)

A. show vlan id ***vian-id:*** displays information about a specific VLAN.

B. show vlan: displays detailed information about all VLANs on the switch.

C. show vlan brief: displays detailed information about all VLANs on the switch.

D. show interfaces fa0/1 switchport: displays information about a specific port.

E. show interfaces fa0/1: displays VLAN information about a specific port.

11. Match the commands with the correct descriptions.

switchport mode trunk

switchport mode dynamic desirabl

switchport nonegotiate

switchport mode acces

A. Configures the port to negotiate a trunk

B. Configures the trunk to not send DTP packets

C. Configures the port as a permanent 802.1Q trunk

D. Disables trunk mode

12. Match the problem definition with the correct problem description.

___ Native VLAN mismatc

___ Trunk mode mismatc

___ Incorrect VLAN lis

___ VLAN subnet conflict

A. Both switches are configured to dynamic auto and will not negotiate a link.

B. Not all the VLANs needed are allowed to traverse a trunk.

C. PCs on the same VLAN are not sharing the same address space.

D. The VLAN configured for untagged frames is not the same on two switches connected by a trunk.

13. The ______________protocol is an industry standard for trunking.

14. Which Layer 2 security issue sends a frame destined for one VLAN to a different VLAN by adding more than one VLAN ID to the header?

A. Double-tagging

B. Switch spoofing

C. PVLAN edge

D. Plaintext vty access

15. Which two design considerations are best practices for switch VLAN design? (Choose two.)

A. Unused ports should be left to the default configuration.

B. The native VLAN should be an unused VLAN.

C. All unused ports should be configured as a part of the black hole VLAN.

D. All unused ports should be configured as a part of the native VLAN.

E. A server should always be configured as a protected port.

F. The management VLAN should be a VLAN not used by any type of user traffic.
G. Disable DTP messages.

Labs

ir

Lab 4.1.1.9: Mapping the Internet

Lab 4.1.4.6: Configuring Basic Router Settings with IOS CLI Lab 4.1.4.7:

Configuring Basic Router Settings with CCP

Packet Tracer
□ **Activity**

Packet Tracer Activities

Packet Tracer Activity 4.1.1.8: Using Traceroute to Discover the Network Packet Tracer

Activity 4.1.2.9: Documenting the Network Packet Tracer Activity 4.1.3.5: Configuring IPv4

and IPv6 Interfaces Packet Tracer Activity 4.1.4.5: Configuring and Verifying a Small

Network Packet Tracer Activity 4.3.2.5: Investigating Directly Connected Routes

Check Your Understanding Questions

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. The appendix, "Answers to the 'Check Your Understanding' Questions," lists the answers.

1. Which two statements correctly describe the components of a router? (Choose two.)

- **A. RAM permanently stores the configuration file used during the boot sequence.**
- **B. ROM contains diagnostics executed on hardware modules.**
- **C. NVRAM stores a backup copy of the IOS used during the boot sequence.**
- **D. Flash memory does not lose its contents during a reboot.**
- **E. ROM contains the most current and most complete version of the IOS.**
- **F. Flash contains boot system commands to identify the location of the IOS.**

2. Which three statements describe features of Cisco devices that perform routing? (Choose three.)
   - A. The IP address of a LAN interface on a Layer 3 device provides the default gateway for hosts connected to that LAN.
   - B. A routing protocol must be enabled in order for a Layer 3 device to build a routing table.
   - C. Routing tables are volatile. When power is removed from a Layer 3 device, the routing table ceases to exist.
   - D. A routing table is automatically created for directly connected, active LAN and WAN interfaces.
   - E. A directly connected Layer 3 interface must be manually added to the routing table in order for routing to be enabled on that interface.

3. What address and prefix length is used when configuring an IPv6 default static route?
   - A. ::/0
   - B. ::1/128
   - C. 0.0.0.0/0
   - D. FF02::1/8

4. What is the purpose of a routing protocol?
   - A. It is used to build and maintain ARP tables.
   - B. It provides a method for segmenting and reassembling data packets.
   - C. It allows an administrator to devise an addressing scheme for the network.
   - D. It allows a router to share information about known networks with other routers.
   - E. It provides a procedure for encoding and decoding data into bits for packet forwarding.

5. Which tasks can be accomplished by using the command history feature? (Choose two.)
   - A. View a list of commands entered in a previous session.
   - B. Recall up to 15 command lines by default.
   - C. Set the command history buffer size.
   - D. Recall previously entered commands.
   - E. Save command lines in a log file for future reference.

6. During the process of encapsulation, how does the PC determine if the packet is destined for a host on a remote network?
   - A. By checking the ARP cache for the destination host MAC address
   - B. By querying the DNS server for the information of the destination host
   - C. By sending a broadcast to the local LAN segment to see if there is any response
   - D. By performing the AND operation on the destination IP address and its own subnet mask

7. When a router learns that multiple paths are available to a destination network from the

same routing protocol, which factor is considered by a router to choose the best path to forward a packet?

A. The lowest metric

B. The order of paths on the routing table

C. The fastest bandwidth of exiting interfaces

D. The reliability value of the neighboring routers

8. Which two statements describe characteristics of load balancing? (Choose two.)

A. Load balancing occurs when a router sends the same packet to different destination networks.

B. Load balancing occurs when the same number of packets is sent over static and dynamic routes.

C. Load balancing allows a router to forward packets over multiple paths to the same destination network.

D. Unequal cost load balancing is supported by EIGRP.

E. If multiple paths with different metrics to a destination exist, the router cannot support load balancing.

9. What is a Gateway of Last Resort?

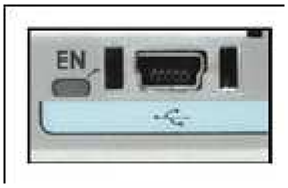
A. The IP address of another router

B. The IP address of the Internet provider

C. A term to describe a default gateway on a host device

D. Where dropped packets are sent

10. Refer to the exhibit.



What is the purpose of the router port that is shown?

A. To back up the IOS

B. To configure the router

C. To run an IOS from an alternative location

D. To connect to a port on a switch

11. What code is used in the routing table to identify routes learned through EIGRP?

A. C

B. D

C. L

D. O

E. S

12. Which two statements describe static routes? (Choose two.)

A. They are created in interface configuration mode.

B. They require manual reconfiguration to accommodate network changes.

C. They automatically become the default gateway of the router.

D. They are identified in the routing table with the prefix *S*.

E. They are automatically updated whenever an interface is reconfigured or shut down.

13. The output of the show ip route command contains the following entry:
S 10.2.0.0 [1/0] via 172.16.2.2. What value is indicated by the 1 in the [1/0] portion of the output?

A. Metric

B. Number of hops

C. Administrative distance

D. Interface ID through which the network can be reached

Check Your Understanding Questions

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. The appendix, "Answers to the 'Check Your Understanding' Questions," lists the answers.

1. Classify each item as either physical interface or subinterface.

one physical interface for many VLANs
bandwidth contention
access mode switch port connection
complex cable configuration
trunk mode switch port connection
one physical interface per VLAN

2. Classify each item as either router-on-a-stick, Layer 3 switch routing, or both.

subinterfaces

____all VLANs share a single cable
____multiple SVIs
____faster
____trunk mode switch port connection
____an IP address per VLAN
____routed port

3. What are three advantages of having a single trunk link on a switch and subinterfaces on the router instead of individual VLAN links between a switch that has three VLANs and a router to route between the VLANs? (Choose three.)

A. It would free two switch and router ports.
B. It would reduce the complexity of the cabling runs.
C. It would increase the amount of bandwidth available for inter-VLAN routing.
D. It would allow for less complex troubleshooting of inter-VLAN routing issues.
E. It would allow adding more VLANs without requiring more cabling or switch ports.
F. It would allow for less-complex configuration of inter-VLAN routing.

4. What condition is required to enable Layer 3 switching?

A. The Layer 3 switch must have IP routing enabled.
B. All participating switches must have unique VLAN numbers.
C. All routed subnets must be on the same VLAN.
D. Inter-VLAN portions of Layer 3 switching must use router-on-a-stick.

5. When implementing router-on-a-stick, what is necessary for establishing communication between VLANs?

A. Multiple switch ports to connect to a single router interface

B. Native VLAN IP address that is configured on the router physical interface

C. All trunk ports configured in access mode

D. Router subinterfaces

6. How does the router-on-a-stick model for inter-VLAN routing differ from traditional routing?

A. The router-on-a-stick model uses multiple physical interfaces on the router, each configured with a different Layer 3 address.

B. The router-on-a-stick model uses a single physical interface on the router with only the **no shutdown** command issued.

C. The router-on-a-stick model uses subinterfaces on the router with only the **no shutdown** command issued on the physical interface.

D. The router-on-a-stick model uses subinterfaces on the switch with only the **no shutdown** command issued on the physical interface.

7. Which command does the network administrator use to determine whether inter-VLAN communication is functioning?

A. show vlan

B. ping

C. ipconfig

D. show interfaces

8. Which three options are valid inter-VLAN routing methods? (Choose three.)

A. Traditional routing

B. Spanning-tree routing

C. Router-on-a-stick

D. 802.1Q routing

E. Multilayer switch-based routing

9. A network technician is configuring a router to support inter-VLAN routing. After entering interface G0/0 configuration mode, the network administrator attempts to enter the command encapsulation dot1q 10. The router refuses to accept this command. What could account for this failure?

A. Router port G0/0 is not physically connected to the switch.

B. VLAN0001 has been renamed.

C. R1 interface G0/0 was configured for subinterface operation.

D. This command can be configured only on router subinterfaces.

E. Interface G0/0 on the switch is shut down.

10. How many physical interfaces are required to perform inter-VLAN routing with each method indicated?

Legacy inter-VLAN routing:__________

Router-on-a-stick:_________

Multilayer switching:_________

11. What command would be used to determine if all SVIs were "up and up" on a multilayer switch?

A. show vlans

B. show ip interface brief

C. show running-config

D. show interface switchport

12. A router-on-a-stick configuration will not allow PC1 on VLAN 10 to communicate with PC2 on VLAN 11. Which two of the following could be the problem? (Choose two.)

A. The physical port on the router is shut down.

B. The switch SVI is not "up and up."

C. The port between the switch and the router is not a routed port.

D. The port between the switch and the router has been placed in access mode.

E. One or both of the router subinterfaces have been configured with an IP address in a different network.

Check Your Understanding Questions

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. The appendix, "Answers to the 'Check Your Understanding' Questions," lists the answers.

1. Which statement is true concerning configuring static routes using next-hop addresses?

   A. Routers cannot use more than one static route with a next-hop address.

   B. When the router identifies that a packet is destined for a route associated with a next-hop address in the routing table, the router requires no further information and can immediately forward the packet.

   C. Routers configured with the static route using a next-hop address must either have the exit interface listed in the route or have another route with the network of the next hop and an associated exit interface.

   D. Routes associated with a next-hop address are more efficient than routes going to exit interfaces.

2. Which of the following are three characteristics of a static route? (Choose three.)

   A. Reduces the memory and processing burdens on a router

   B. Ensures that there is always a path available

   C. Used to dynamically find the best path to a destination network

   D. Used for routers that connect to stub networks

   E. Used for networks with a single route to a destination network

   F. Reduces configuration time

3. Which option shows a correctly configured IPv4 default static route?

   A. ip route 0.0.0.0 0.0.0.0 S0/0/0

   B. ip route 0.0.0.0 255.255.255.0 S0/0/0

   C. ip route 0.0.0.0 255.255.255.255 S0/0/0

   D. ip route 0.0.0.0 255.0.0.0 S0/0/0

4. A network administrator enters the following command into Routerl: ip route 192.168.0. 0 255.255.255.0 S0/1/0. Routerl then receives a packet that is destined for 192.168.0.22/24. After finding the recently configured static route in the routing table, what does Router1 do next to process the packet?

   A. Drops the packet because the destination host is not listed in the routing table

   B. Looks up the MAC address of the S0/1/0 interface to determine the destination MAC address of the new frame

   C. Performs a recursive lookup for the IP address of the S0/1/0 interface before forwarding the packet

   D. Encapsulates the packet into a frame for the WAN link and forwards the packet out the

S0/1/0 interface

5. What type of static route is created when the next-hop IP address and exit interface are specified?

   A. Recursive static route

   B. Directly connected static route

   C. Fully specified static route

   D. Floating static route

6. Why would a summarized static route be configured on a router?

   A. To reduce the number of public IP addresses required by an organization

   B. To provide a better route than a particular routing protocol

   C. To provide a default gateway for a router that connects to an ISP

   D. To reduce the size of the routing table

   E. To reduce the size of the routing protocol update to a neighboring router

7. Which subnet mask would be used for a network that has a maximum of 300 devices?

   A. 255.255.255.0

   B. 255.255.254.0

   C. 255.255.252.0

   D. 255.255.248.0

   E. 255.255.240.0

8. Which two conditions must exist in order to summarize IPv6 routes into a single static IPv6 route? (Choose two.)

   A. The destination networks are contiguous and can be summarized into a single network address.

   B. The multiple static routes all use different exit-interface or next-hop IPv6 address.
   C. The destination networks are not contiguous.

   D. The multiple static routes all use the same exit-interface or next-hop IPv6 address.

   E. The administrative distance is greater than the administrative distance of another static route or dynamic routes.

9. What command, or set of commands, would be used to determine if the following configuration on router HQ works as designed?

```
ip route 0.0.0.0 0.0.0.0 serial 0/0/0 10 ip route 0.0.0.0 0.0.0.0 serial 0/1/0
```

   A.
```
HQ(config)# interface serial 0/1/0 HQ(config-if)# shutdown
HQ(config-if)# end
HQ# show ip route
```

B. HQ# traceroute 128.107.0.99

C. HQ# show ip interface brief

D. HQ# ping 128.107.0.99 HQ# ping 64.100.0.5

E. HQ# show ip route

10. Which is a valid summary route for networks 192.168.8.0/22, 192.168.12.0/22, and 192.168.16.0/22?

A. 192.168.0.0/18

B. 192.168.0.0/19

C. 192.168.0.0/20

D. 192.168.8.0/21

W
f

Labs

Lab 7.3.2.4: Configuring RIPv2

Packet Tracer Activities

Packet Tracer □
Activity

Packet Tracer 7.1.3.6: Investigating Convergence Packet Tracer 7.2.2.4: Comparing RIP and

EIGRP Path Selection Packet Tracer 7.3.1.8: Configuring RIPv2 Packet Tracer 7.3.2.3:

Configuring RIPng

Check Your Understanding Questions

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. The appendix, "Answers to the 'Check Your Understanding' Questions," lists the answers.

1. What is the difference between interior and exterior routing protocols?
   - A. Exterior routing protocols are used only by large ISPs. Interior routing protocols are used by small ISPs.
   - B. Interior routing protocols are used to route on the Internet. Exterior routing protocols are used inside organizations.
   - C. Exterior routing protocols are used to administer a single autonomous system. Interior routing protocols are used to administer several domains.
   - D. Interior routing protocols are used to communicate within a single autonomous system. Exterior routing protocols are used to communicate between multiple autonomous systems.

2. Which factor directly affects the time to convergence?
   - A. Data link layer protocol used
   - B. Number of hosts
   - C. Size of the network
   - D. Type of applications used

3. Which classless routing protocol supports VLSM and CIDR, supports manual route summarization, and uses the multicast address 224.0.0.9?

A. RIPvl

B. RIPv2

C. OSPF

D. EIGRP

4. What are two characteristics of link-state protocols compared to distance vector protocols? (Choose two.)

A. They require a lot of hardware resources.

B. They know of the network topology from the perspective of their neighbors.

C. They compute their own knowledge of the network topology.

D. They use hop counts to compute the network topology.

E. They flood the routing table periodically.

5. Which classless routing protocol supports VLSM and CIDR, bounded and triggered updates, and uses the multicast address of 224.0.0.10?

A. RIPvl

B. RIPv2

C. OSPF

D. EIGRP

6. Which algorithm is used by the OSPF routing process to construct the SPF tree on a router?

A. DUAL algorithm

B. Bellman-Ford algorithm

C. Dijkstra’s algorithm

D. Path vector protocol

7. What is an advantage of OSPF compared to RIP?

A. Fast convergence

B. Less complexity

C. Less CPU processing

D. Low memory requirements

8. A network administrator has examined the routing table of a router and noted that the entry for the destination network 172.16.4.0/24 begins with the letter D. What does this letter signify?

A. The route to network 172.16.4.0/24 is directly connected.

B. **The route source was learned dynamically.**

C. **That is the direct route for packets to that network.**

D. **The route to this network is configured statically on the router.**

9. What is the purpose of classifying Cisco IP routing table entries as ultimate route, level 1 route, level 1 parent route, and level 2 child routes?

A. **To enable the implementation of dynamic routing protocols**

B. **To explain the operation of the routing table as a flat database**

C. **To enable Cisco routers to implement both IPv4 and IPv6 routing**

D. **To explain the operation of the hierarchical structure of the routing table**

10. What are two functions of dynamic routing protocols? (Choose two.)

A. **To**

B. **To**

C. **To**

D. **To**

E. **To**

Packet Tracer Activities

Packet Tracer
☐ **Activity**

Packet Tracer 8.2.2.7: Configuring OSPFv2 in a Single Area Packet Tracer 8.3.3.5: Configuring Basic OSPFv3 Packet Tracer 8.4.1.2: Skills Integration Challenge

Check Your Understanding Questions

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. The appendix, "Answers to the 'Check Your Understanding' Questions," lists the answers.

1. What will an OSPF router prefer to use first as a router ID?

A. Any IP address that is configured using the **router-id** command
B. A loopback interface that is configured with the highest IP address on the router
C. The highest active interface IP that is configured on the router
D. The highest active interface that participates in the routing process because of a specifically configured **network** statement

2. At which OSPF state are neighbor routers converged and can exchange routing updates?

A. Two-Way
B. ExStart
C. Exchange
D. Full

3. Which OSPF wildcard mask would be appropriate to use for the given network prefix?

A. /30 and 0.0.0.2
B. /13 and 0.7.255.255
C. /23 and 0.0.2.255
D. /18 and 0.0.64.255

4. Which statement is correct about multiarea OSPF?

A. OSPF can consolidate a fragmented OSPF area into one large area.
B. All routers are in one area called the backbone area (area 0).
C. Arranging routers into areas partitions a large autonomous system to lighten the load on routers.
D. OSPF multiarea increases the frequency of SPF calculation.

5. A network technician issues the following commands when configuring a router:

```
R1(config)# router ospf 11
R1(config-router)# network 10.10.10.0 0.0.0.255 area 0
```

What does the number 11 represent?

A. The autonomous system number to which R1 belongs
B. The area number where R1 is located
C. The cost of the link to R1
D. The OSPF process ID on R1
E. The administrative distance that is manually assigned to R1

6. The OSPF Hello timer has been set to 15 seconds on a router in a point-to-point network. By default, what is the dead interval on this router?

A. 15 seconds
B. 30 seconds
C. 45 seconds
D. 60 seconds

7. A network administrator configures a loopback interface as the OSPF router ID with the IP address of 192.168.1.1/30. What could be the consequence of using this 30-bit mask for the loopback interface?

A. Older routers do not recognize the **router-id** command.
B. The interface is not enabled for OSPF.
C. OSPF routers must also be configured with a router priority value.
D. This loopback interface may be advertised as a reachable network.

8. What are three entries that are displayed by the **show ip ospf neighbor** command? (Choose three.)

A. The route metric and neighbor next-hop address
B. The router ID of the neighboring routers
C. The OSPF state of each interface
D. The OSPF process ID used to establish the adjacency
E. The OSPF area number shared by the neighbor routers

F. The IP address of the neighbor router interface to which this router is directly connected

9. Which statement describes a difference or similarity between OSPFv2 and OSPFv3?

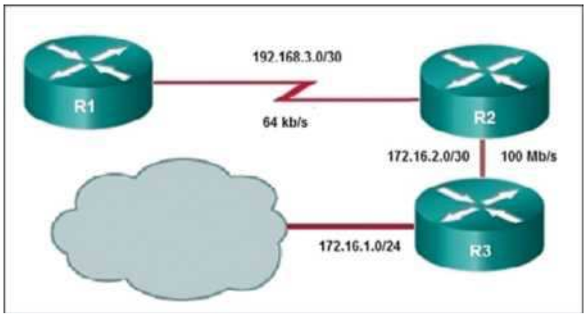
A. OSPFv2 requires the DR/BDR election to occur on multiaccess networks only, whereas OSPv3 requires DR/BDR elections for all network types.

B. Both OSPFv2 and OSPFv3 use the router configuration **network** command to advertise networks.

C. Both OSPFv2 and OSPFv3 use multicast destination addresses for link-state packets.

D. OSPFv2 uses a 32-bit router ID and OSPFv3 uses a 128 bit router ID.

10. Refer to the exhibit. With the default metric settings, the OSPF cost for R1 to reach the network 172.16.1.0 is



A. 64

B. 1563

C. 65

D. 1564

E. 10

F. 1

Check Your Understanding Questions

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. The appendix, "Answers to the 'Check Your Understanding' Questions," lists the answers.

1. **What range of IP addresses is represented by the network and wildcard mask 192.168.70.0 0.0.0.127?**

   - **A. 192.168.70.0 to 192.168.70.127**
   - **B. 192.168.70.0 to 192.168.70.255**
   - **C. 192.168.70.0 to 192.168.70.63**
   - **D. 192.168.70.0 to 192.168.71.255**

2. **What range of IP addresses is represented by the network and wildcard mask 192.168.70.0 0.0.1.255?**

   - **A. 192.168.70.0 to 192.168.71.255**
   - **B. 192.168.70.0 to 192.168.70.255**
   - **C. 192.168.70.0 to 192.168.73.255**
   - **D. 192.168.70.0 to 192.168.76.255**

3. **What range of IP addresses is represented by the network and wildcard mask 172.16.32.0 0.0.15.255?**

   - **A. 172.16.32.0 to 172.16.47.255**
   - **B. 172.16.32.0 to 172.16.34.255**
   - **C. 172.16.32.0 to 172.16.63.255**
   - **D. 172.16.32.0 to 172.16.240.255**

4. **Which set of access control entries would allow all users on the 192.168.10.0/24 network to access a web server that is located at 172.17.80.1, but would not allow them to use Telnet?**

   - **A. access-list 103 deny tcp host 192.168.10.0 any eq 23 access-list 103 permit tcp host 192.168.10.1 eq 80**
   - **B. access-list 103 permit 192.168.10.0 0.0.0.255 host 172.17.80.1 access-list 103 deny tcp 192.168.10.0 0.0.0.255 any eq telnet**
   - **C. access-list 103 permit tcp 192.168.10.0 0.0.0.255 host 172.17.80.1 eq 80 access-list 103 deny tcp 192.168.10.0 0.0.0.255 any eq 23**
   - **D. access-list 103 permit tcp 192.168.10.0 0.0.0.255 any eq 80 access-list 103 deny tcp 192.168.10.0 0.0.0.255 any eq 23**

5. **In applying an ACL to a router interface, which traffic is designated as outbound?**
   - **A. Traffic that is coming from the source IP address into the router**
   - **B. Traffic that is leaving the router and going toward the destination host**
   - **C. Traffic that is going from the destination IP address into the router**
   - **D. Traffic for which the router can find no routing table entry**

6. **In the creation of an IPv6 ACL, what is the purpose of the implicit final command entries permit icmp any any nd-na and permit icmp any any nd-ns?**
   - **A. To allow IPv6 to MAC address resolution**
   - **B. To allow forwarding of IPv6 multicast packets**
   - **C. To allow automatic address configuration**
   - **D. To allow forwarding of ICMPv6 packets**

7. **What is the effect of the established parameter in an extended ACL?**
   - **A. Blocks all incoming traffic from reaching a network**
   - **B. Allows external traffic into a network only if it is part of an existing connection with an internal host**
   - **C. Allows external sources to send unsolicited requests for information to source IP addresses in the network**
   - **D. Allows traffic from a permitted source address to go to any destination outside the network**

8. **ACLs are used primarily to filter traffic. What are two additional uses of ACLs? (Choose two.)**
   - **A. Specifying source addresses for authentication**
   - **B. Specifying internal hosts for NAT**
   - **C. Identifying traffic for QoS**
   - **D. Reorganizing traffic into VLANs**
   - **E. Filtering VTP packets**

9. **Which two statements are correct about extended ACLs? (Choose two.)**
   - **A. Extended ACLs use a number range from 1 through 99.**
   - **B. Extended ACLs end with an implicit permit statement.**
   - **C. Extended ACLs evaluate the source and destination addresses.**
   - **D. Port numbers can be used to add greater definition to an ACL.**
   - **E. Multiple ACLs can be placed on the same interface as long as they are in the same direction.**

10. Which command is used to activate an IPv6 ACL named ENG_ACL on an interface so that the router filters traffic prior to accessing the routing table?

- A. access-group ipv6_ENG_ACL in
- B. access-group ipv6_ENG_ACL out
- C. ipv6 access-class ENG_ACL in
- D. ipv6 access-class ENG_ACL out
- E. ipv6 traffic-filter ENG_ACL in
- F. ipv6 traffic-filter ENG_ACL out

Check Your Understanding Questions

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. The appendix, "Answers to the 'Check Your Understanding' Questions," lists the answers.

1. Which statements are true about the DHCP server functions? (Choose two.)

   A. When a client requests an IP address, the DHCP server searches the binding table for an entry that matches the client's MAC address. If an entry exists, the corresponding IP address for the entry is returned to the client.
   B. Clients can be assigned an IP address from a predefined DHCP pool for a finite lease period.
   C. DHCP services must be installed on a dedicated network server to define the pool of IP addresses available to the client.
   D. The DHCP server can answer requests and assign IP addresses for a particular subnet only.
   E. Each subnet in the network requires a dedicated DHCP server to assign IP addresses to the host on the subnet.
   F. DHCP provides clients with an IP address, a subnet mask, a default gateway, and optionally, a domain name.

2. Consider the following configuration:

```
R1(config)# ip dhcp pool 192.168.10.0
```

   What is the function of the **`192.168.10.0`** argument?

   A. Name of the DCHP pool
   B. Pool of IP addresses available for lease
   C. Range of excluded IP addresses
   D. Subnet where the DHCP server resides

3. Which three statements about DHCPv4 are true? (Choose three.)

   A. DHCP messages use UDP as a transport protocol.
   B. The DHCPOFFER message is sent by a DHCP server after receiving a DHCPDISCOVER message from a client.
   C. DHCP uses ports 67 and 68.
   D. The DHCPREQUEST message is sent by a DHCP client to locate a DHCP server.
   E. The DHCPACK message is sent by the DHCP server to provide the DHCP client with the DHCP server MAC address for further communications.
   F. All DHCP communications are broadcast.

4. Refer to Figure 10-7. If PC3 used R1 as a DHCPv4 server, on what interface would the **ip helper-address** be configured?

   A. R3 S0/0/0
   B. Any interface on R3

C. R3 S0/0/1

D. R3 G0/0

5. If a DHCPv6 client resides on subnet 192.168.30.0/24 and the DHCPv6 server resides on subnet 192.168.10.0/24, why is it necessary for a DHCPv6 Relay Agent?

A. Because DHCPv6 does not use broadcasts
B. Because a DHCPv6 client cannot use a DHCP server on a remote network
C. Because DHCPv6 messages still need to be relayed if the DHCPv6 server resides on a different network

D. Because DHCP v6 messages must be converted to a broadcast to be heard across multiple networks

6. Which two methods of assigning an IPv6 address to a router interface are automatic and can be used in conjunction with one another? (Choose two.)

A. EUI-64

B. Static assignment

C. DNS

D. DHCPv6

E. Stateless autoconfiguration

7. Place the four DHCPv4 steps in the order they occur. Note that not all options will be used.

DHCPREQUEST

DHCPLEASE

DHCPACK

DHCPDISCOVER

DHCPREPLY

DHCPOFFER

First: ______________________________

Second: ____________________________

Third:______________________________

Fourth:_____________________________

8. Which DHCP message types are originated by a DHCPv4 server? (Select all that apply.)

[DHCPREQUEST | DHCPLEASE | DHCPACK | DHCPDISCOVER | DHCPREPLY | DHCPOFFER]

9. What type of IPv6 message is used by an IPv6 host to automatically obtain an IPv6 address from a router?

A. broadcast

B. DNS

C. RS

D. ARP

10. Which DHCPv6 option is most like DHCPv4?

A. SLAAC

B. Stateful DHCPv6

C. Stateless DHCPv6

D. EUI-64

11. Match the DHCPv6 command with the purpose. Note that not all options are used.

_______ Enables IPv6 routing.

_______ RA messages sent to an interface with this command indicates that additional information is available from a stateless DHCPv6 server.

_______ Used on a router interface connected to a DHCPv6 client, and the DHCPv6 server is on a different link.

_______ Causes a router interface to request a DHCPv6 address.

_______ RA messages sent to an interface with this command indicates that the client is to obtain IP addressing information from a stateful DHCPv6 server.

A. ipv6 nd other-config-flag

B. ipv6 dhcp relay destination

C. ipv6 dhcp

D. ipv6 unicast-routing

E. ipv6 nd managed-config-flag

F. ipv6 routing

G. ipv6 address dhcp

12. What are the two port numbers used by DHCPv6? (Choose two.) [67 | 68 I 546 I 547 | 1025 I 1026 I 34768 I 34769]

Packet Tracer
□ **Activity**

Packet Tracer Activities

Packet Tracer Activity 11.1.2.6: Investigating NAT Operation

Packet Tracer Activity 11.2.1.4: Configuring Static NAT

Packet Tracer Activity 11.2.2.5: Configuring Dynamic NAT

Packet Tracer Activity 11.2.3.6: Implementing Static and Dynamic NAT

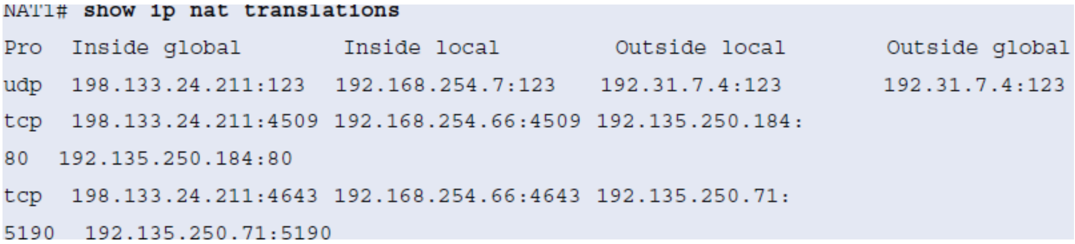
Packet Tracer Activity 11.3.1.4: Verifying and Troubleshooting NAT Configurations

Packet Tracer Activity 11.4.1.2: Skills Integration Challenge

Check Your Understanding Questions

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. The appendix, "Answers to the 'Check Your Understanding' Questions," lists the answers.

1. Refer to the following output:



```
NAT1# show ip nat translations
Pro  Inside global        Inside local         Outside local        Outside global
udp  198.133.24.211:123  192.168.254.7:123   192.31.7.4:123       192.31.7.4:123
tcp  198.133.24.211:4509 192.168.254.66:4509 192.135.250.184:
80  192.135.250.184:80
tcp  198.133.24.211:4643 192.168.254.66:4643 192.135.250.71:
5190  192.135.250.71:5190
```

Based on the output, which statement is true about the NAT configuration?

- **A.** Static NAT is configured.
- **B.** Dynamic NAT is configured.
- **C.** NAT Overload (PAT) is configured.
- **D.** NAT is configured incorrectly.

2. What is the default timeout value for NAT translations?

- **A.** One hour
- **B.** One day
- **C.** One week
- **D.** Indefinite

3. Match the characteristic to the NAT technique. Note that a technique can have more than one characteristic.

A. Provides one-to-one fixed mappings of local and global addresses

B. Assigns the translated address of IP hosts from a pool of public addresses

C. Can map multiple addresses to a single address of an external interface

D. Assigns unique source port numbers of an inside global address on a session- by-session basis

E. Allows an external host to establish sessions with an internal host

_____ Dynamic NAT

_____ PAT

_____ Static NAT

4. Consider the following configuration:

```
R2(config)# ip nat inside source static 192.168.0.100 209.165.200.2
R2(config)# interface serial0/0/0
R2(config-if)# ip address 10.1.1.2 255.255.255.252
R2(config-if)# ip nat inside
R2(config-if)# exit
R2(config)# interface serial0/1/0
R2(config-if)# ip address 209.165.200.225 255.255.255.224
R2(config-if)# ip nat outside
R2(config-if)# exit
```

Which host(s) will be translated by NAT?

A. 10.1.1.2

B. 192.168.0.100

C. 209.165.200.2

D. All hosts on the 10.1.1.0 network

E. All hosts on the 192.168.0.0 network

5. Consider the following configuration:

```
R2(config)# ip nat pool nat-pool1 209.165.200.225 209.165.200.240 netmask 255.255.255.0
R2(config)# ip nat inside source list 1 pool nat-pool1
R2(config)# interface serial0/0/0
R2(config-if)# ip address 10.1.1.2 255.255.255.252
R2(config-if)# ip nat inside
R2(config-if)# exit
R2(config)# interface serial0/1/0
R2(config-if)# ip address 209.165.200.1 255.255.255.224
R2(config-if)# ip nat outside
R2(config-if)# exit
R2(config)# access-list 1 permit 192.168.0.0 0.0.0.31
```

Which addresses will be translated by NAT?

A. 10.1.1.2 to 10.1.1.255

B. 192.168.0.0 to 192.168.0.255

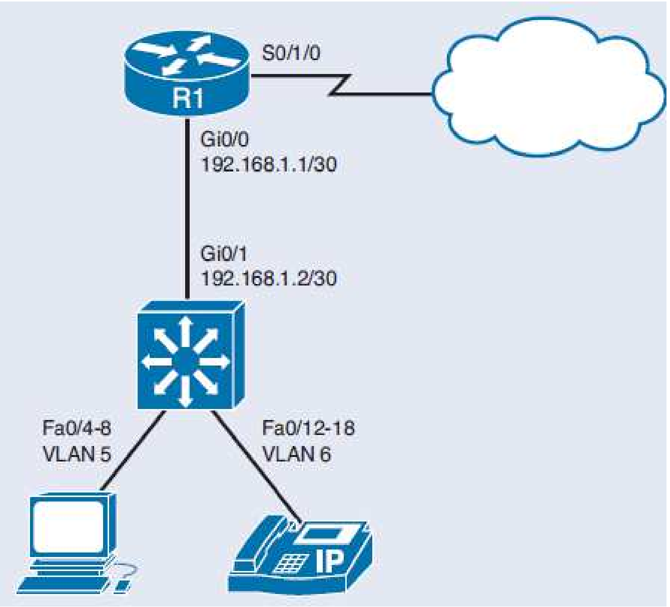
C. 192.168.0.0 to 192.168.0.31

D. 209.165.200.240 to 209.165.200.255

E. Only host 10.1.1.2

F. Only host 209.165.200.255

6. **Consider the following topology.**



On which interface(s) would NAT be applied?

A. Only S0/1/0

B. Only Gi0/0

C. Only on S0/1/0 and Gi0/0

D. Only on Gi0/0 and Gi0/1

E. Only on S0/1/0, Gi0/0, and Gi0/1

F. On all interfaces

7. Which NAT solution allows external users to access an internal SFTP server on a network that uses private IP addresses?

A. Dynamic NAT

- **B.** PAT
- **C.** Static NAT
- **D.** NAT overload

8. What are two disadvantages of NAT? (Choose two.)

- **A.** Uses too many legally registered addresses.
- **B.** Decreases the number of connections that can be used to the public network.
- **C.** Network device performance.
- **D.** End-to-end traceability is lost.
- **E.** Increased network costs.
- **F.** Increased provider costs.

9. What is the last step in configuring PAT with an address pool?

- **A.** Creating the access list
- **B.** Defining the address pool
- **C.** Binding the access list to the address pool
- **D.** Applying NAT to at least two interfaces

10. What parameter defines what internal addresses are translated by NAT?

- **A.** The access list
- **B.** The address pool
- **C.** The interface(s) that have the command ip nat inside applied
- **D.** The interface(s) that have the command ip nat outside applied

11. What is the effect of adding the keyword overload to a NAT configuration?

- **A.** More interfaces can participate in NAT.
- **B.** More internal address can be translated into one or more public addresses.
- **C.** The router is placed into stealth mode verifying that the address translation is not overtaxing the router hardware.
- **D.** Public IP addresses can be added to the NAT pool dynamically.

12. What is the most commonly deployed IPv6 NAT method recommended for all IPv6-based companies?

- **A.** NAT for IPv6
- **B.** IPv6 tunneling
- **C.** PAT for IPv6
- **D.** None of these

Questions from

IT 257 PDF

CISCO IT 257

Lab 1-2: Basic Router Configuration (1.5.2)

Complete this lab if you have solid skills in device cabling, establishing a console connection, and CLI basics. If you need a review of these skills, you can substitute Lab 1-1: Cabling a Network and Basic Router Configuration (1.5.1) for this lab.

Lab 1-3: Challenge Router Configuration (1.5.3)

This lab challenges your subnetting and configuration skills. Given an address space and network requirements, you are expected to design and implement an addressing scheme in a two-router topology.

Packet Tracer
☐ **Companion**

Many of the hands-on labs include Packet Tracer Companion Activities, where you can use Packet Tracer to complete a simulation of the lab. Look for this icon in *Routing Protocols and Concepts, CCNA Exploration Labs and Study Guide* (ISBN 1-58713-204-4) for hands-on labs that have a Packet Tracer Companion.

Check Your Understanding

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. The appendix, "Check Your Understanding and Challenge Questions Answer Key," lists the answers.

1. Which of the following matches a router component with its function?

   A. Flash: Permanently stores the bootstrap program
   B. ROM: Permanently stores the startup configuration file
   C. NVRAM: Permanently stores the operating system image
   D. RAM: Stores the routing tables and ARP cache

2. Which two commands can a technician use to determine whether router serial ports have IP addresses that are assigned to them?

   A. **show interfaces**
   B. **show interfaces ip brief**
   C. **show controllers all**
   D. **show ip config**
   E. **show ip interface brief**

3. Which of the following commands will set the privileged mode password to “quiz”?

   A. R1(config)# **enable secret quiz**

   B. R1(config)# **password secret quiz**

   C. R1(config)# **enable password secret quiz**

   D. R1(config)# **enable secret password quiz**

4. Which routing principle is correct?

   A. If one router has certain information in its routing table, all adjacent routers have the same information.

   B. Routing information about a path from one network to another implies routing information about the reverse, or return, path.

   C. Every router makes its routing decisions alone, based on the information it has in its own routing table.

   D. Every router makes its routing decisions based on the information it has in its own routing table and its neighbor routing tables.

5. What two tasks do dynamic routing protocols perform?

   A. Discover hosts

   B. Update and maintain routing tables

   C. Propagate host default gateways

   D. Network discovery

   E. Assign IP addressing

6. A network engineer is configuring a new router. The interfaces have been configured with IP addresses and activated, but no routing protocols or static routes have been configured yet. What routes are present in the routing table?

   A. Default routes.

   B. Broadcast routes.

   C. Direct connections.

   D. No routes; the routing table is empty.

7. What two statements are correct regarding how a router forwards packets?

   A. If the packet is destined for a remote network, the router forwards the packet out all interfaces that might be a next hop to that network.

   B. If the packet is destined for a directly connected network, the router forwards the packet out the exit interface indicated by the routing table.

   C. If the packet is destined for a remote network, the router forwards the packet based on the information in the router host table.

   D. If the packet is destined for a remote network, the router sends the packet to the next-hop IP in the routing table.

   E. If the packet is destined for a directly connected network, the router forwards the packet based on the destination MAC address.

   F. If the packet is destined for a directly connected network, the router forwards the packet to the switch on the next-hop VLAN.

8. Which statement is true regarding metrics used by routing protocols?

   A. A metric is the quantitative value that a routing protocol uses to measure a given route.

   B. A metric is a Cisco-proprietary means to convert distances to a standard unit.

   C. Metrics represent a composite value of the amount of packet loss occurring for all routing protocols.

   D. Metrics are used by the router to determine whether a packet has an error and should be dropped.

9. The network administrator configured the **ip route 0.0.0.0 0.0.0.0 serial 0/0/0** command on the router. How will this command appear in the routing table, assuming that the Serial 0/0/0 interface is up?

   A. D 0.0.0.0/0 is directly connected, Serial0/0/0

   B. S* 0.0.0.0/0 is directly connected, Serial0/0/0

   C. S* 0.0.0.0/0 [1/0] via 192.168.2.2

   D. C 0.0.0.0/0 [1/0] via 192.168.2.2

10. Describe the internal and external router hardware components, and outline the purpose of each.

11. Describe the router bootup process from power on to final configuration.

12. What important features does a router add to the network?

13. Describe the steps necessary to apply a basic configuration to a router.

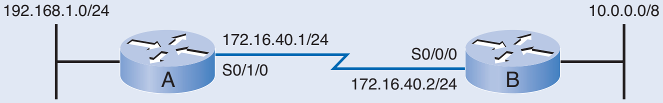
14. Describe the importance of the routing table. What purposes does it serve?

Check Your Understanding

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. The appendix, "Check Your Understanding and Challenge Questions Answer Key," lists the answers.

1. Refer to Figure 2-13. Which two commands must be configured to allow communication between the 192.168.1.0/24 and 10.0.0.0/8 networks?

Figure 2-13 Topology for Quiz Question #1



   A. A(config)# **ip route 10.0.0.0 255.0.0.0 172.16.40.2**
   B. A(config)# **ip route 10.0.0.0 255.0.0.0 s0/0/0**
   C. A(config)# **ip route 10.0.0.0 255.0.0.0 10.0.0.1**
   D. B(config)# **ip route 192.168.1.0 255.255.255.0 172.16.40.1**
   E. B(config)# **ip route 192.168.1.0 255.255.255.0 172.16.40.2**
   F. B# **ip route 192.168.1.0 255.255.255.0 192.168.1.1**

2. Which statement is true concerning configuring static routes using next-hop addresses?

   A. Routers cannot use more than one static route with a next-hop address.
   B. When the router identifies that a packet is destined for a route associated with a next-hop address in the routing table, the router requires no further information and can immediately forward the packet.
   C. Routers configured with the static route using a next-hop address must either have the exit interface listed in the route or have another route with the network of the next hop and an associated exit interface.
   D. Routes associated with a next-hop address are more efficient than routes going to exit interfaces.

3. Refer to the following command output. The network administrator must remove the route to the 10.0.0.0 network. What command will accomplish this task?

```
R1# show ip route

<output omitted>

Gateway of last resort is not set

S    10.0.0.0/8 [1/0] via 172.16.40.2
     64.0.0.0/16 is subnetted, 1 subnets
C      64.100.0.0 is directly connected, Serial0/1
C    128.107.0.0/16 is directly connected, Loopback2
     172.16.0.0/24 is subnetted, 1 subnets
S       172.16.40.0 is directly connected, Serial0/0
C    192.168.1.0/24 is directly connected, FastEhternet0/0
C    192.168.2.0/24 [1/0] via 172.16.40.2
C    198.133.219.0/24 is directly connected, Loopback0
```

A. **no ip address 10.0.0.1 255.255.255.0 172.16.40.2**

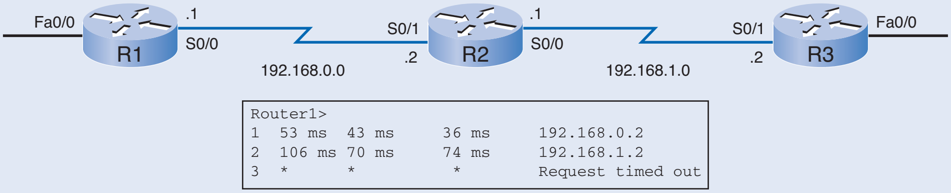
B. **no static-route 10.0.0.0 255.0.0.0**

C. **no ip route 10.0.0.0 255.0.0.0 172.16.40.2**

D. **no ip route 10.0.0.1 255.255.255.0**

4. Refer to Figure 2-14. What command was used on Router R1 to produce the output shown in the graphic?

Figure 2-14 Topology for Quiz Question #4



```
Router1>
1  53 ms  43 ms     36 ms     192.168.0.2
2  106 ms 70 ms     74 ms     192.168.1.2
3  *      *          *        Request timed out
```

A. **traceroute**

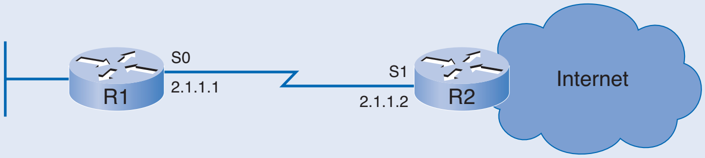
B. **extended ping**

C. **show ip route**

D. **show cdp neighbor detail**

5. Refer to Figure 2-15. Which command correctly configures a static default route on R1?

Figure 2-15 Topology for Quiz Question #5



A. R1(config-if)# **ip route 0.0.0.0 0.0.0.0 s0**

B. R1(config)# **ip route 0.0.0.0 0.0.0.0 s1**

C. R1(config-if)# **ip route 0.0.0.0 0.0.0.0 2.1.1.2**

D. R1(config)# **ip route 0.0.0.0 0.0.0.0 2.1.1.2**

E. R1(config-router)# **default-information originate**

6. Which of the following are three characteristics of a static route?

A. Reduces the memory and processing burdens on a router

B. Ensures that there is always a path available

C. Used to dynamically find the best path to a destination network

D. Used for routers that connect to stub networks

E. Used for networks with a single route to a destination network

F. Reduces configuration time

7. Which of the following is a function of the IOS command **show cdp neighbors**?

A. It displays the port type and platform of neighboring Cisco routers.

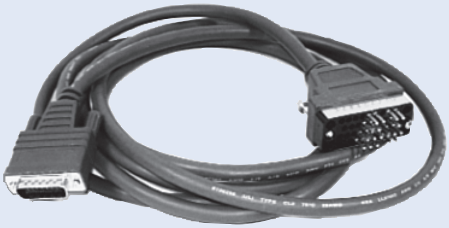
B. It displays the device capability code of all non-Cisco routers.

C. It displays platform information for all devices in the network.

D. It displays the protocol encapsulation used by neighboring routers.

8. Refer to Figure 2-16. What type of connector is shown in the exhibit?

Figure 2-16 Graphic for Quiz Question #8



A. The DB-60 DTE end of the serial cable for 1600 and 2500 series routers

B. The DTE end of a smart serial cable used with newer routers

C. The EIA/TIA-530 DCE end of a serial cable that plugs into the CSU/DSU

D. The V.35 DCE end of a serial cable that plugs into the CSU/DSU

E. The EIA/TIA-232 DCE end of a serial cable that plugs into the CSU/DSU

F. The EIA/TIA-449 DCE end of a serial cable that plugs into the CSU/DSU

9. Which statement is true concerning directly connected routes?

A. They appear in the routing table as soon as cables are connected to the router.

B. They appear in the routing table when an IP address is configured on an interface.

C. They appear in the routing table when the **no shutdown** command is entered in router interface configuration mode.

D. They appear in the routing table when the **show interface** command shows that the interface is up, line protocol is up.

10. Choose the proper command that is associated with each of the following configuration tasks.

    Configuration tasks:

    Enter global configuration mode

    Enter interface configuration mode

    Configure an IP address

    Activate the interface

    Commands:

    A. **interface fastethernet 0/0**
    B. **ip address 192.168.35.11 255.255.255.0**
    C. **ip address 192.168.35.11/24**
    D. **config terminal**
    E. **ip 192.168.35.11 255.255.255.0**
    F. **ip 192.168.35.11/24**
    G. **no shutdown**
    H. **show interfaces fastethernet 0/0**

11. Match the following **show/debug** commands with the proper outputs.

    show ip route:

    show ip interface brief:

    show interfaces:

    show controllers:

    debug ip routing:

    show cdp neighbors:

    Output:

    A. Display all known networks
    B. Display detailed port information
    C. Display routing troubleshooting information
    D. Display basic port information
    E. Display directly connected routers
    F. Display DTE/DCE information

Activities and Labs

The activities and labs available in the companion *Routing Protocols and Concepts, CCNA Exploration Labs and Study Guide* (ISBN 1-58713-204-4) provide hands-on practice with the following topics introduced in this chapter:

Activity 3-1: Subnetting Scenario 1 (3.5.2)

In this activity, you have been given the network address 192.168.9.0/24 to subnet and provide the IP addressing for the network shown in the topology diagram.

Activity 3-2: Subnetting Scenario 2 (3.5.3)

In this activity, you have been given the network address 172.16.0.0/16 to subnet and provide the IP addressing for the network shown in the topology diagram.

Activity 3-3: Subnetting Scenario 3 (3.5.4)

In this activity, you have been given the network address 192.168.1.0/24 to subnet and provide the IP addressing for the network shown in the topology diagram.

Packet Tracer
☐ **Companion**

Many of the hands-on labs include Packet Tracer Companion Activities, where you can use Packet Tracer to complete a simulation of the lab. Look for this icon in *Routing Protocols and Concepts, CCNA Exploration Labs and Study Guide* (ISBN 1-58713-204-4) for hands-on labs that have a Packet Tracer Companion.

Check Your Understanding

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. Answers are listed in the appendix, "Check Your Understanding and Challenge Questions Answer Key."

1. What are two advantages of static routing over dynamic routing?

A. The configuration is less error prone.

B. Static routing is more secure because routers do not advertise routes.

C. Growing the network usually does not present a problem.

D. No computing overhead is involved.

E. The administrator has less work maintaining the configuration.

2. Match the description to the proper routing protocol.

   Routing protocols:

   RIP

   IGRP

   OSPF

   EIGRP

   BGP

   Description:

   A. Path vector exterior routing protocol:
   B. Cisco advanced interior routing protocol:
   C. Link-state interior routing protocol:
   D. Distance vector interior routing protocol:
   E. Cisco distance vector interior routing protocol:

3. Which statement best describes convergence on a network?

   A. The amount of time required for routers to share administrative configuration changes, such a password changes, from one end of a network to the other end
   B. The time required for the routers in the network to update their routing tables after a topology change has occurred
   C. The time required for the routers in one autonomous system to learn routes to destinations in another autonomous system
   D. The time required for routers running disparate routing protocols to update their routing tables

4. Which of the following parameters are used to calculate metrics? (Choose two.)

   A. Hop count
   B. Uptime
   C. Bandwidth
   D. Convergence time
   E. Administrative distance

5. Which routing protocol has the most trustworthy administrative distance by default?

   A. EIGRP internal routes
   B. IS-IS
   C. OSPF
   D. RIPv1
   E. RIPv2

6. How many equal-cost paths can a dynamic routing protocol use for load balancing by default?

   A. 2
   B. 3
   C. 4
   D. 6

7. Which command will show the administrative distance of routes?

   A. R1# **show interfaces**
   B. R1# **show ip route**
   C. R1# **show ip interfaces**
   D. R1# **debug ip routing**

8. When do directly connected networks appear in the routing table?

   A. When they are included in a static route
   B. When they are used as an exit interface
   C. As soon as they are addressed and operational at Layer 2
   D. As soon as they are addressed and operational at Layer 3
   E. Always when a **no shutdown** command is issued

9. Router R1 is using the RIPv2 routing protocol and has discovered multiple unequal paths to reach a destination network. How will Router R1 determine which path is the best path to the destination network?

   A. Lowest metric.
   B. Highest metric.
   C. Lowest administrative distance.
   D. Highest administrative distance.
   E. It will load-balance between up to four paths.

10. Enter the proper administrative distance for each routing protocol.

    A. eBGP:
    B. EIGRP (Internal):
    C. EIGRP (External):
    D. IS-IS:
    E. OSPF:
    F. RIP:

11. Designate the following characteristics as belonging to either a classful routing protocol or a classless routing protocol.
    - A. Does not support discontiguous networks:
    - B. EIGRP, OSPF, and BGP:
    - C. Sends subnet mask in its routing updates:
    - D. Supports discontiguous networks:
    - E. RIP version 1 and IGRP:
    - F. Does not send subnet mask in its routing updates:
12. Explain why static routing might be preferred over dynamic routing.
13. What are four ways of classifying dynamic routing protocols?
14. What are the most common metrics used in IP dynamic routing protocols?
15. What is administrative distance, and why is it important?

Challenge Questions and Activities

These questions require a deeper application of the concepts covered in this chapter and are similar to the style of questions you might see on a CCNA certification exam. You can find the answers to these questions in the appendix, "Answers to Check Your Understanding and Challenge Questions and Activities."

1. It can be said that every router must have at least one static route. Explain why this statement might be true.
2. Students new to routing sometimes assume that bandwidth is a better metric than hop count. Why might this be a false assumption?

To Learn More

Border Gateway Protocol (BGP) is an inter-autonomous routing protocol—the routing protocol of the Internet. Although BGP is only briefly discussed in this course (it is discussed more fully in CCNP), you might find it interesting to view routing tables of some of the Internet core routers.

Route servers are used to view BGP routes on the Internet. Various websites provide access to these route servers, for example, http://www.traceroute.org. When choosing a route server in a specific autonomous system, you will start a Telnet session on that route server. This server is mirroring an Internet core router, which is most often a Cisco router.

Split horizon and split horizon with poison reverse are also used by routers to help prevent routing loops. The split horizon rule states that a router should never advertise a route through the interface from which it learned that route. Split horizon with poison reverse means that it is better to explicitly state that this router does not have a route to this network by poisoning the route with a metric stating that the route is unreachable.

Distance vector routing protocols are sometimes referred to as "routing by rumor," although this can be somewhat of a misnomer. Distance vector routing protocols are popular with many network administrators because they are typically easily understood and simple to implement. This does not necessarily mean that link-state routing protocols are any more complicated or difficult to configure.

Unfortunately, link-state routing protocols have received this somewhat unwarranted reputation. You will learn in later chapters that link-state routing protocols are as easy to understand and configure as distance vector routing protocols.

Activities and Labs

The activities and labs available in the companion *Routing Protocols and Concepts, CCNA Exploration Labs and Study Guide* (ISBN 1-58713-204-4) provide hands-on practice with the following topics introduced in this chapter:

Lab 4-1: Routing Table Interpretation Lab (4.6.1)

In this lab activity, you re-create a network based only on the output from the **show ip route** command. Then, to verify your answer, you configure the routers and compare the actual routing table to the routing table shown in the lab documentation.

Packet Tracer
Companion

Many of the hands-on labs include Packet Tracer Companion Activities, where you can use Packet Tracer to complete a simulation of the lab. Look for this icon in *Routing Protocols and Concepts, CCNA Exploration Labs and Study Guide* (ISBN 1-58713-204-4) for hands-on labs that have a Packet Tracer Companion.

Check Your Understanding

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. Answers are listed in the appendix, "Check Your Understanding and Challenge Questions Answer Key."

1. Which four statements are true regarding some distance vector routing protocols?

   A. Hop counts can be used for path selection.

   B. They scale well.

   C. Routing updates are broadcast at intervals.

   D. EIGRP can do unequal-cost load balancing.

   E. RIPv1 multicasts its routing updates.

   F. RIP sends its entire routing table to directly connected neighbors (except for any routes affected by split horizon).

2. Which conditions cause some distance vector routing protocols to send routing table updates? (Choose three.)

   A. When the hold-down timer expires

   B. When a change occurs in the network topology

   C. When the update timer value expires

   D. When a triggered update is received from another router

   E. When a packet is received that is destined for an unknown network

   F. When there have been no routing table changes for 30 minutes

3. What are two characteristics of EIGRP updates?

   A. Include all EIGRP routes

   B. Include the full routing table

   C. Independent of architecture

   D. Only triggered for route topology changes

   E. Broadcast to affected neighbors

   F. Bounded only to those routers that need the update

4. What feature was added to RIP to help with synchronization errors?

   A. Hold-down timer

   B. RIP_JITTER

   C. RIP_DELAY

   D. Jitter control

5. Which two of the following are timers used for RIP?

   A. Invalid

   B. Refresh

   C. Flush

   D. Deadlink

   E. Hello

6. Which statement is true concerning the advantages of a distance vector protocol?

   A. Periodic updates speed convergence.

   B. Convergence times make routing loops impossible.

   C. Ease of implementation makes configuration simple.

   D. They work well in complex networks.

   E. Their convergence times are faster than link-state routing protocols.

7. Which mechanism can be used to avoid a count-to-infinity loop?

   A. Split horizon

   B. Route poisoning

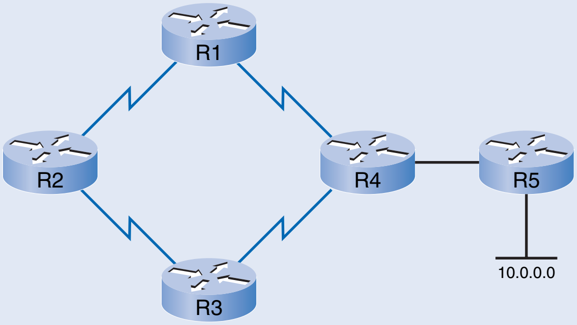
   C. Hold-down timers

   D. Triggered updates

   E. Split horizon with poison reverse

8. Refer to Figure 4-28. The network shown is running the RIP routing protocol. What mechanism will keep Router R4 from sending updates about the 10.0.0.0 network back to Router R5?

Figure 4-28 Check Your Understanding, Question #8



   A. Split horizon

   B. Poison reverse

   C. Route poisoning

   D. Hold-down timers

   E. Maximum hop count

9. What allows RIP to avoid routing loops by advertising a metric of infinity?

   A. Split horizon

   B. Route poisoning

   C. Hold-down timers

   D. Maximum hop count

   E. Time to Live (TTL) field of the IP header

10. Which field in the IP header ensures that packets will not loop endlessly on a network?

    A. CRC

    B. TOS

    C. TTL

    D. Checksum

11. Match the loop-preventing mechanism with its corresponding function.

    Loop-prevention mechanism:

    Split horizon:

    Route poisoning:

    Hold-down timers:

    Triggered updates:

    Function:

    A. Routes learned through an interface are not advertised out that same interface.

    B. Routes learned through an interface are advertised back out the same interface as unreachable.

    C. Topology changes are immediately sent to adjacent routers.

    D. This allows time for topology changes to travel through an entire network.

Challenge Questions and Activities

These questions require a deeper application of the concepts covered in this chapter and are similar to the style of questions you might see on a CCNA certification exam. You can find the answers to these questions in the appendix, "Answers to Check Your Understanding and Challenge Questions and Activities."

1. Briefly explain the basic operation of RIP and IGRP.

2. Explain convergence and why it is important.

3. What are the four main timers used by RIP? How many seconds are in each timer? What is the purpose of each timer?
4. What five techniques do distance vector routing protocols use to prevent routing loops?

To Learn More

Understanding the distance vector algorithm is not difficult. There are many books and online sources that show how algorithms such as the Bellman-Ford algorithm are used in networking. There are several websites devoted to explaining how these algorithms work. Seek out some of the resources and familiarize yourself with how this algorithm works.

Here are some suggested resources:

- *Interconnections, Bridges, Routers, Switches, and Internetworking Protocols*, by Radia Perlman
- *Cisco IP Routing*, by Alex Zinin
- *Routing the Internet*, by Christian Huitema

Check Your Understanding

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. Answers are listed in the appendix, "Check Your Understanding and Challenge Questions Answer Key."

1. Which statement is true about the **debug ip rip** command?

   A. It searches through the running configuration and shows possible errors in the RIP configuration.

   B. It displays RIP routing updates as they are sent and received.

   C. It automatically identifies routing loops.

   D. It shows the history of RIP updates over the previous 90 seconds.

2. What problem does the **passive-interface** command help resolve?

   A. Prevents confusion if both RIPv1 and RIPv2 are being advertised on a network

   B. Prevents wasted bandwidth and processing from unnecessary updates

   C. Prevents routing loops

   D. Prevents updates from being sent out without a password

3. What makes a router a boundary router in RIP?

   A. If it is on the edge of an autonomous system

   B. If a router has multiple interfaces in more than one major classful network

   C. If it runs both RIP and EIGRP at the same time

   D. If it is configured to be a boundary router by an administrator

4. What command is used with RIP to propagate default routes to neighbors?

   A. **network 0.0.0.0**

   B. **ip summary-address rip address mask**

   C. **ip default-network address**

   D. **default-information originate**

5. What command will create a candidate default route on a RIP router?

   A. **default-information originate**

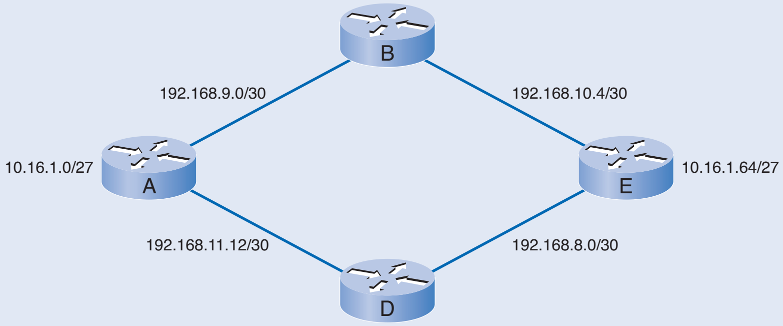
   B. **ip default-network 0.0.0.0**

   C. **ip default-gateway 192.168.0.1**

   D. **ip route 0.0.0.0 0.0.0.0 serial0/0/0**

6. Refer to Figure 5-14. All routers are running RIPv1. The interfaces on all routers are up and stable. Users on the 10.16.1.0 network cannot access services on the 10.16.1.64 network. What is the cause of this problem?

Figure 5-14 Check Your Understanding: Question #6



A. The RIP hold-down timer in Router A is not allowing the 10.16.1.64 network into routing updates.

B. The network uses variable-length subnet masking, and RIPv1 does not allow this.

C. The 10.16.1.x subnets are discontiguous.

D. Routers A and B need to have their interfaces configured as passive interfaces.

7. How does a router running RIPv1 determine the subnet mask of the routes that are received in routing updates?

A. The subnet mask is included in the routing update.

B. The router sends a request for the subnet mask to the sending router.

C. The router uses the subnet mask of the local interface or the default subnet mask for the address class in the routing update.

D. The router calculates the subnet mask based on the variable-length subnetting in its own configuration.

E. The router defaults to 255.255.255.0 for all updates.

8. Refer to the following output. What is the administrative distance of the route to the 172.30.3.0 network?

```
<output omitted>
C       172.30.1.0 is directly connected, FastEthernet0/0
C       172.30.2.0 is directly connected, Serial0/0/0
R       172.30.3.0 [120/1] via 172.30.2.2, 00:00:05, Serial0/0/0
<output omitted>
```

A. 0

B. 1

C. 12

D. 24

E. 120

9. What is the purpose of the **network** command when RIP is being configured as the routing protocol?

A. It identifies the networks connected to the neighboring router.

B. It restricts networks from being used for static routes.

C. It identifies all the destination networks that the router is allowed to install in its routing table.

D. It identifies the directly connected networks that will be included in the RIP routing updates.

10. To ensure proper routing in a network, the network administrator should always check the router configuration to verify that appropriate routes are available. Match the commands with their appropriate function.

Command:

debug ip rip

show ip protocols

show running-config

show ip route

show interfaces

Function:

A. Displays current configuration information for configured routing protocols and interfaces

B. Checks to see that the interfaces are up and operational

C. Displays the networks advertised in the updates as the updates are sent and received

D. Verifies that the routing protocol is running and advertising the correct networks

E. Verifies that the routes received are installed in the routing table

Packet Tracer
☐ Companion

Many of the hands-on labs include Packet Tracer Companion Activities, where you can use Packet Tracer to complete a simulation of the lab. Look for this icon in *Routing Protocols and Concepts, CCNA Exploration Labs and Study Guide* (ISBN 1-58713-204-4) for hands-on labs that have a Packet Tracer Companion.

Check Your Understanding

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. The section, "Check Your Understanding and Challenge Questions Answer Key" at the end of this chapter lists the answers.

1. For each of the following routing protocols, indicate whether it supports VLSM (VLSM or non-VLSM).

   RIPv1:

   EIGRP:

   IGRP:

   IS-IS:

   OSPF:

   RIPv2:

2. For each of the following definitions, indicate whether it is describing VLSM or route summarization.

   Combining several IP network addresses in one IP address:

   Ability to specify a different subnet mask for the same network number and different subnets:

   Used in supernetting:

   Conserves address space:

   Used to reduce the number of entries in a routing table:

3. What two methods allowed the continued use of IPv4 addressing and helped delay the need to implement IPv6?

   A. Subnetting was variable-length.
   B. The IPv4 address range was expanded.
   C. Private addresses were used with address translation.
   D. Classful routing was implemented.
   E. IPv4 was abandoned in favor of IPv6 for all hosts.
   F. Supernetting was implemented.

4. The following subnet masks have been chosen for use with the 192.168.16.0 network:

255.255.255.252

255.255.255.240

255.255.255.192

Which of the following identify the most efficient use for each of these masks? (Choose three.)

A. Use the /30 mask for point-to-point links, such as WAN connections.
B. Use the /30 mask for subnetworks of four or more hosts.
C. Use the /28 mask for small subnetworks with up to 14 hosts.
D. Use the /26 mask for larger subnetworks with up to 62 hosts.
E. Use the /25 mask for subnetworks with up to 30 hosts.
F. Use the /24 mask for point-to-point links, such as WAN connections.

5. When using a classful Class A IP address scheme, how many octets are used to designate the network portion of the address?

A. 1
B. 2
C. 3
D. 4

6. Match the VLSM subnet with the network size it is most appropriate for. Each answer can be used only once.

VLSM subnets:

172.16.64.0/18

172.16.16.64/30

172.16.128.0/19

172.16.18.0/24

172.16.5.128/26

Number of hosts:

A. 2
B. 60
C. 250
D. 8000
E. 16,000

7. A network engineer is summarizing the two groups of routes, group A and group B, on Router R1. Which summarization will work for all subnets?

   Group A:

   192.168.0.0/30

   192.168.0.4/30

   192.168.0.8/30

   192.168.0.16/29

   Group B:

   192.168.4.0/30

   192.168.5.0/30

   192.168.6.0/30

   192.168.7.0/29

   A. 192.168.0.0/23
   B. 192.168.0.0/22
   C. 192.168.0.0/21
   D. 192.168.0.0/28

8. How many bits are used in the IPv4 address space?

   A. 8
   B. 12
   C. 16
   D. 30
   E. 32
   F. 64

9. For the following classful network addresses, indicate whether the address is a Class A address or a Class B address.

   191.254.45.0: Class

   123.90.78.45: Class

   128.44.0.23: Class

   129.68.11.45: Class

   126.0.0.0: Class

   125.33.23.56: Class

Lab 7-2: RIPv2 Challenge Configuration (7.5.2)

In this lab activity, you are given a network address that must be subnetted using VLSM to complete the addressing of the network. A combination of RIP Version 2 and static routing will be required so that hosts on networks that are not directly connected will be able to communicate with each other and the Internet.

Lab 7-3: RIPv2 Troubleshooting (7.5.3)

In this lab, you begin by loading configuration scripts on each of the routers. These scripts contain errors that will prevent end-to-end communication across the network. After loading the corrupted scripts, troubleshoot each router to determine the configuration errors, and then use the appropriate commands to correct the configurations. When you have corrected all the configuration errors, all the hosts on the network should be able to communicate with each other.

Packet Tracer
☐ **Companion**

Many of the hands-on labs include Packet Tracer Companion Activities, where you can use Packet Tracer to complete a simulation of the lab. Look for this icon in *Routing Protocols and Concepts, CCNA Exploration Labs and Study Guide* (ISBN 1-58713-204-4) for hands-on labs that have a Packet Tracer Companion.

Check Your Understanding

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. Answers are listed in the appendix, "Check Your Understanding and Challenge Questions Answer Key."

1. How do you disable automatic summarization in RIPv2?

   A. Router(config)# **no auto-summary**

   B. Router(config-router)# **no auto-summary**

   C. Router(config-if)# **no auto-summary**

   D. It is not recommended that you disable automatic summarization.

2. Which of the following describes a discontiguous network?

   A. A classful network that has subnets separated by one or more different major networks

   B. A classful network with VLSM

   C. A network subnetted with a mask less than the classful mask

3. When would you disable automatic summarization on RIPv2? (Choose all that apply.)

   A. When you want to minimize the size of the routing tables

   B. When you have discontiguous networks

   C. When you are using VLSM

   D. When there is a need to propagate individual subnets

4. What is the defining characteristic of a classless routing protocol?

   A. The capability of sending a nonsummarized subnet address

   B. The capability of including the subnet mask in the route advertisement

   C. Sending routing updates as link-state advertisements

   D. Using a metric other than hop count

5. What is the default behavior of RIPv2 regarding automatic summarization?

   A. By default, automatic summarization is enabled in RIPv2.

   B. By default, automatic summarization is disabled in RIPv2.

   C. There is no automatic summarization in RIPv2. Summarization can only be done manually.

6. True or False: RIPv2 does not include the subnet mask in the routing update if the network has been summarized.

   A. True

   B. False

Challenge Questions and Activities

These questions require a deeper application of the concepts covered in this chapter and are similar to the style of questions you might see on a CCNA certification exam. You can find the answers to these questions in the appendix, “Answers to Check Your Understanding and Challenge Questions and Activities.”

before Cisco IOS Software Release 11.3. Classful routing behavior can be implemented using the **no ip classless** command.

Starting with Cisco IOS Software Release 11.3, classless routing behavior became the default. If there is a match with a parent route but none of the child routes, the routing table process continues to search other routes in the routing table, including a default route and supernet route should one exist. To implement classless routing behavior, use the **ip classless** command.

Routes to networks get added to the routing table from various sources, including directly connected networks, static routes, classful routing protocols, and classless routing protocols. The lookup process, classful or classless routing behavior, is independent of the source of the route. A routing table might have routes learned from a classful routing protocol such as RIPv1 but use classless routing behavior, **no ip classles**s, for the lookup process.

Activities and Labs

The activities and labs available in the companion *Routing Protocols and Concepts, CCNA Exploration Labs and Study Guide* (ISBN 1-58713-204-4) provide hands-on practice with the following topics introduced in this chapter:

Lab 8-1: Investigating the Routing Table Lookup Process (8.4.1)

In this lab, you investigate classless and classful routing behavior.

Lab 8-2: The show ip route Challenge Lab (8.4.2)

In this lab, you determine the topology of a network using the outputs from the **show ip route** command.

Packet Tracer
☐ **Companion**

Many of the Hands-on Labs include Packet Tracer Companion Activities where you can use Packet Tracer to complete a simulation of the lab. Look for this icon in the *Labs and Study Guide* (ISBN 1-58713-204-4) for Hands-on Labs that have a Packet Tracer Companion.

Check Your Understanding

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. Answers are listed in the appendix, “Check Your Understanding and Challenge Questions Answer Key.”

1. Refer to the following output. What three types of routes are displayed in this routing table? (Choose three.)

```
<output omitted>
     10.0.0.0/16 is subnetted, 1 subnets
S        10.1.0.0 is directly connected, Serial0/0/1
     172.16.0.0/24 is subnetted, 4 subnets
R        172.16.1.0 [120/1] via 172.16.2.1, 00:00:12, Serial0/0/0
S        172.16.2.0 is directly connected, Serial0/0/0
C        172.16.3.0 is directly connected, FastEthernet0/0
R        172.16.4.0 [120/1] via 172.16.2.1, 00:00:12, Serial0/0/1
C    192.168.1.0/24 is directly connected, Serial0/0/1
<output omitted>
```

A. Networks local to this router

B. The default route for this router

C. Static routes on this router

D. Mobile routes

E. Routes learned from dynamic routing protocols

F. Routes learned from a non-Cisco router

2. Which characteristic can be used to determine whether a route is an ultimate route?

A. The route displays a subnet mask.

B. The route is a parent route.

C. The route was configured by an administrator.

D. The route includes an exit interface.

3. Refer to the following output. Which two routes are considered parent routes? (Choose two.)

```
<output omitted>
     10.0.0.0/16 is subnetted, 1 subnets
S       10.1.0.0 is directly connected, Serial0/0/1
     172.16.0.0/24 is subnetted, 4 subnets
R       172.16.1.0 [120/1] via 172.16.2.1, 00:00:12, Serial0/0/0
S       172.16.2.0 is directly connected, Serial0/0/0
C       172.16.3.0 is directly connected, FastEthernet0/0
R       172.16.4.0 [120/1] via 172.16.2.1, 00:00:12, Serial0/0/1
C    192.168.1.0/24 is directly connected, Serial0/0/1
<output omitted>
```

A. 172.16.0.0/24

B. 172.16.4.0

C. 172.16.1.0

D. 10.0.0.0/16

E. 192.168.1.0/24

F. 192.168.100.0/24

4. Router R1 is configured with **R1(config)#ip classless** and **R1(config)#ip route 0.0.0.0 0.0.0.0 s0/0/0**. What will R1 do with a packet that matches a parent route but does not match any associated child routes?

A. Forward the packet using the longest parent route match

B. Forward the packet via the default route

C. Return the packet with an ICMP "Destination Unreachable" message to the source address

D. Drop the packet

5. What action will enable classful routing behavior on a router?

A. Configuring RIPv1 or IGRP

B. Configuring a link-state routing protocol

C. Using only classful netmasks on all networks

D. Issuing the **no ip classless** command

6. In the route lookup process, what constitutes the preferred route?

A. The ultimate route

B. The longest match of leftmost bits

C. The shortest prefix length

D. The first route that resolves to an exit interface

7. If a packet matches a level 1 parent route in the routing table, what occurs next in the lookup process?

   A. The router drops the packet because level 1 requires an exit interface.

   B. The router looks for the level 2 child route with an exit interface.

   C. The router sends the packet out all interfaces except the one in which it was received.

   D. The router ARPs all connected networks to find the interface with the destination on it.

8. What do the **ip classless** and **no ip classless** commands do?

   A. Determine the address lookup behavior of the routing process

   B. Specify whether the router will accept subnet masks in routing updates

   C. Restrict the use of classful or classless routing protocols

   D. Allow the router to accept or not accept VLSM for interface addresses

9. Router R1 is configured with **R1(config)#no ip classless** and **R1(config)#ip route 0.0.0.0 0.0.0.0 s0/0/0**. What will R1 do with a packet that matches a parent route but does not match any associated child routes?

   A. Forward the packet using the longest parent route match

   B. Forward the packet via the default route

   C. Return the packet with an ICMP "Destination Unreachable" message to the source address

   D. Drop the packet

10. Refer to the following output. RouterC is running Cisco IOS Software Release 12.3. The router receives a packet with a destination of 172.16.1.130. Which route will RouterC use to forward the packet?

```
RouterC#show ip route
<output omitted>

Gateway of last resort is 0.0.0.0 to network 0.0.0.0

     172.16.0.0/13 is subnetted, 1 subnets
S       172.16.0.0 is directly connected, FastEthernet0/0
     172.16.0.0/16 is variably subnetted, 3 subnets, 2 masks
R       172.16.0.0/24 [120/3] via 172.16.1.1, 00:00:12, FastEthernet0/0
C       172.16.1.0/25 is directly connected, FastEthernet0/0
     172.17.0.0/25 is subnetted, 1 subnets
C       172.17.1.0 is directly connected, FastEthernet0/1
S*   0.0.0.0/0 is directly connected, FastEthernet0/0
```

A. C 172.16.1.0/25 is directly connected, FastEthernet0/0.

B. 172.16.0.0/16 is variably subnetted, 3 subnets, 2 masks.

C. R 172.16.0.0/24 [120/3] via 172.16.1.1, 00:00:12, FastEthernet0/0.

D. 172.16.0.0/13 is subnetted, 1 subnet.

E. S 172.16.0.0 is directly connected, FastEthernet0/0.

F. None. It will drop the packet.

11. What makes a level 1 or level 2 route an ultimate route?

12. When is the subnet mask displayed with the child route and not the parent route?

13. Does the network administrator configure the parent route?

14. Can there be a parent route without any child routes?

15. Before any level 2 child routes are examined for a match, what must match?

16. What determines how many bits must match between the destination IP address of a packet and a route in the routing table?

17. What is the current default routing behavior on Cisco routers, and what command can be used to modify this?

the new LSP to all other routers within the same area. When a router receives the new LSP, it will update its LSDB, rerun the SPF algorithm, create a new SPF tree, and update its routing table.

Link-state routing protocols tend to have a faster convergence time than distance vector routing protocols. A notable exception is EIGRP. However, link-state routing protocols do require more memory and processing requirements. This is usually not an issue with today's newer routers.

In the next and final chapter of this course, you will learn about the link-state routing protocol OSPF.

Activities and Labs

The activities and labs available in the companion *Routing Protocols and Concepts, CCNA Exploration Labs and Study Guide* (ISBN 1-58713-204-4) provide hands-on practice. There are no hands-on labs or activities related to this chapter's topics; however, you will find coverage of the hands-on labs or activities associated with the other chapters, where applicable.

Check Your Understanding

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. The answers are listed in the appendix, "Check Your Understanding and Challenge Questions Answer Key."

1. Which routing protocol is considered a link-state protocol?

   A. RIPv1

   B. RIPv2

   C. EIGRP

   D. IS-IS

   E. BGP

2. Which of the following mechanisms are used by link-state routing protocols to build and maintain routing tables? (Choose three.)

   A. Service network advertisements
   B. Hello packets
   C. Link-state packets
   D. Routing table broadcasts
   E. Shortest path first algorithm
   F. Spanning Tree Protocol

3. For each attribute, determine whether it is associated with a distance vector routing protocol or link-state routing protocol.

   Hardware intensive:

   Uses Bellman-Ford algorithm:

   Fast convergence:

   Uses timed updates:

   Builds complete topology:

   Referred to at times as “routing by rumor”:

   Uses Dijkstra’s algorithm:

4. What is one advantage of link-state protocols over most distance vector protocols?

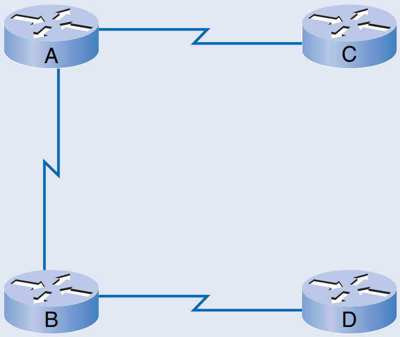
   A. Ability to route IPX
   B. Continual route checking with periodic updates
   C. Faster convergence
   D. Lower hardware requirements

5. Why do link-state protocols converge faster than most distance vector protocols?

   A. Distance vector protocols compute their routing tables before sending routing updates; link-state protocols do not.
   B. Link-state protocols have lower computing requirements than distance vector protocols.
   C. Link-state protocols send updates out more often than distance vector protocols.
   D. Distance vector protocols receive more packets per update than link-state protocols.

6. Refer to Figure 10-14. If all routers are using a link-state routing protocol, which routers does Router A send Hello packets to?

Figure 10-14 Check Your Understanding, Question #6



A. B, C
B. B, C, D
C. Only the DR
D. Only the BR and BDR

7. What information is contained in LSPs sent by link-state routers to their neighbors?

A. A copy of the routing table
B. A copy of the topology database
C. The state of directly connected links
D. The most current version of the SPF tree

8. What is one disadvantage of link-state protocols over distance vector protocols?

A. Slow convergence
B. Flat network topology
C. Periodic updates
D. Higher processing requirements

9. After two OSPF routers have exchanged Hello packets and formed an adjacency, what is the next thing to occur?

A. They will take turns broadcasting their entire routing table to each other.
B. They will start sending link-state packets to each other.
C. They negotiate to determine which will be the root router of the OSPF domain.
D. They will adjust their Hello timers so that they don't collide with each other.

10. How does a router learn about a directly connected network?
    - A. When the administrator configures a static route
    - B. When the administrator configures a dynamic routing protocol
    - C. When the administrator assigns an IP address and subnet mask to the interface
    - D. When a broadcast address is discovered on a specific interface
11. Why is a distance vector routing protocol like a road sign?
12. Why is a link-state routing protocol like a road map?
13. What algorithm do link-state routing protocols use?
14. In link-state routing terminology, what is a link?
15. In link-state routing terminology, what is a link state?
16. In link-state routing terminology, what is a neighbor, and how are neighbors discovered?
17. What does the link-state flooding process do? What is the end result of this process?
18. Where are LSPs stored, and how are they used?

Challenge Questions and Activities

These questions require a deeper application of the concepts covered in this chapter and are similar to the style of questions you might see on a CCNA certification exam. You can find the answers to these questions in the appendix, “Answers to Check Your Understanding and Challenge Questions and Activities.”

1. Do link-state routing protocols send out periodic updates?
2. What are the advantages of a link-state routing protocol compared to a distance vector protocol?
3. What are the requirements of using a link-state routing protocol? What can help minimize these requirements?
4. What are two common link-state routing protocols used today for routing IP?

Lab 11-3: OSPF Troubleshooting (11.6.3)

In this lab, you begin by loading configuration scripts on each of the routers. These scripts contain errors that will prevent end-to-end communication across the network.

You need to troubleshoot each router to determine the configuration errors, and then use the appropriate commands to correct the configurations.

When you have corrected all the configuration errors, all the hosts on the network should be able to communicate with each other.

Packet Tracer ☐ Companion

Many of the Hands-on Labs include Packet Tracer Companion Activities where you can use Packet Tracer to complete a simulation of the lab. Look for this icon in the *Labs and Study Guide* (ISBN 1-58713-204-4) for Hands-on Labs that have a Packet Tracer Companion.

Check Your Understanding

Complete all the review questions listed here to test your understanding of the topics and concepts in this chapter. Answers are listed in the appendix, "Check Your Understanding and Challenge Questions Answer Key."

1. Which of the following statements are true regarding routing protocols that use the link-state routing algorithm? (Choose three.)

   A. They are known collectively as link-state routing protocols.
   B. They learn routes and send them to directly connected neighbors.
   C. They maintain a database of the network topology.
   D. They are based on the Dijkstra algorithm.
   E. They are considered a good choice for small networks with low-end routers.

2. Match the OSPF description with the proper term.

   OSPF descriptions:

   Creates and maintains neighbor adjacencies

   Triggered when a topology change has occurred

   Description of an interface and its relationship to other routers

   Calculates the best path to each destination network

   OSPF terms:

   A. LSA
   B. State of the link
   C. SPF algorithm
   D. Hello packet

3. What reasons would a network administrator have for using loopback interfaces when configuring OSPF? (Choose two.)

   A. Loopbacks are logical interfaces and do not go down.

   B. Only loopback addresses can be used for an OSPF router ID.

   C. Loopback interfaces are used to set the OSPF metric.

   D. The loopback address will be used as the router ID, overriding the physical IP address values.

   E. OSPF error checking is enabled by loopback addresses.

   F. The loopback address will override the configured router priority value.

4. In which of the following types of networks will OSPF designated routers not be elected? (Choose two.)

   A. Point to point

   B. Point to multipoint

   C. Broadcast multiaccess

   D. Nonbroadcast multiaccess

5. A network administrator enters the **router ospf 100** command. What is the function of the number **100** in this command?

   A. Autonomous system number

   B. Metric

   C. Process ID

   D. Administrative distance

6. On a router running OSPF, what is the purpose of entering the **bandwidth 56** command on a serial interface?

   A. Changes the cost value

   B. Functions only as a description

   C. Changes the throughput of the interface to 56 Kbps

   D. Is necessary for the DUAL algorithm

7. What factor does the Cisco implementation of OSPF use to pick the best route?

   A. Uptime

   B. Reliability

   C. Bandwidth

   D. Load

   E. Shortest number of hops

8. Which command allows a router to advertise default static routes via OSPF?

   A. **redistribute static**

   B. **network 0.0.0.0 0.0.0.0 area 0**

   C. **default-information originate**

   D. Default routes are local only and cannot be advertised using OSPF.

9. During an OSPF DR/BDR election, what is used to determine the DR or BDR when participating OSPF routers have identical interface priorities?

   A. The highest OSPF process ID

   B. The lowest interface IP address

   C. The lowest interface cost

   D. The router ID

10. Which packet type is invalid for OSPF?

   A. Hello

   B. LRU

   C. LSR

   D. LSAck

   E. DBD

11. In the **router ospf** command, does the process ID need to match on all routers?

12. Given the following configuration, what is the OSPF router ID of RouterA?

```
RouterA(config)#interface serial 0/0/0
RouterA(config-if)#ip add 192.168.2.1 255.255.255.252
RouterA(config)#interface loopback 0
RouterA(config-if)#ip add 10.1.1.1 255.255.255.255
RouterA(config)#router ospf 1
RouterA(config-if)#network 192.168.2.0 0.0.0.3 area 0
```

13. What command enables you to verify or determine the bandwidth value of an interface used by the OSPF metric?

14. What command enables you to modify the OSPF cost of an interface without modifying the bandwidth value of that interface?

15. What is the default Hello interval on Ethernet networks and serial point-to-point networks? What is the default Hello interval on NBMA networks?

16. What values must match before two routers will form an OSPF adjacency?

17. What problems does electing a DR and BDR solve?

18. How are the DR and BDR elected?

Questions from Old CISCO Sources

CISCO IT 257

CCNA2 Chapter 1 Practice

Where should a crossover UTP cable be used? (Choose 2)

- ***To connect two PCs together directly.***
- To connect a router to an Ethernet switch.
- To connect a PC to an Ethernet switch.
- To make a console connection to a router.
- ***To connect two routers together using their Ethernet ports.***
- To connect the serial port of a router to a switch.

Which of these actions will the default gateway router of an Ethernet network do when it receives a frame addressed to another network? (Choose 2)

- ***Check that the destination MAC address is its own MAC address.***
- Check that the destination MAC address is the correct address for the destination host.
- ***Remove the frame header and trailer.***
- Encapsulate the frame with a new packet header.
- Check that the destination IP address is its own IP address.

Which addresses are unchanged throughout the journey of a packet across several networks? (Choose 2)

- Destination MAC address
- Source MAC address
- ***Destination IP address***
- ***Source IP address***

What must a router do before it can look up a route in its routing table?

- Remove the packet header to decapsulate the layer 3 addresses.
- ***Perform a logical AND using the destination IP address and the subnet mask.***
- Perform a logical AND using the source IP address and the destination IP address.
- Perform a logical AND using the source IP address and the subnet mask.
- Convert the IP addresses from decimal to binary.

Which is an advantage of dynamic routing over static routing?

- Less bandwidth is used by the routing process.
- The administrator has greater control over security.
- ***Routers will adjust routes automatically if there are topology changes.***
- The routers need less processing power.

Where might static routing be preferred to dynamic routing? (Choose 2)

- ***In a small star topology where there is only one possible route to each destination.***
- In a topology where several possible routes exist and changes are likely.
- ***In a small group of networks where bandwidth is an issue and its use must be restricted.***
- In a group of networks where the routers are modern and powerful.

Where does a router store its IOS in the long term?

- RAM
- ROM
- NVRAM
- ***Flash memory***

Where does a router store its configuration file in the long term?

- RAM
- ROM
- ***NVRAM***
- Flash memory

Where does a router store its routing table?

- ***RAM***
- ROM
- NVRAM
- Flash memory

Where does a router store its POST instructions?

- RAM
- ***ROM***
- NVRAM
- Flash memory

Where does a router store a limited version of an IOS for emergency use?

- RAM
- ***ROM***
- NVRAM
- Flash memory

Which statements are true about Cisco IOS and the router boot process? (Choose 2)

- ***Modern routers load the IOS into RAM during the boot process, and run the IOS from RAM during normal operation.***
- ***A router can be configured to load its IOS from a TFTP server during the boot process.***
- The IOS is always stored in Flash memory and loaded from there.
- A complete copy of the IOS is held in ROM and can be loaded from there.
- A backup copy of the IOS is often held in NVRAM in case the main file is lost.

If there is no startup configuration file in NVRAM, where will a router try to find a configuration on start-up.

- Flash memory
- ***TFTP server***
- Neighbouring router
- Hard disk of console PC
- ROM

What will cause a router to enter setup mode? (Choose 2)

- ***The administrator enters the setup command from privileged exec mode after the router has started up.***
- The administrator enters the enable command from user exec mode after the router has started up.
- The administrator uses the Ctrl + c hotkey combination as the router is starting up.
- The router locates a configuration file on a local TFTP server during the boot process.
- The router will enter setup mode automatically if no configuration file can be found.
- ***No configuration file was loaded and the administrator responded yes when prompted to enter setup.***

Which is true of setup mode?

- It is the quickest way to give a router a complete configuration.
- It is the most widely used method of configuring a router.
- ***It is not widely used by network administrators.***
- ***It can be used to give a router a basic configuration.***
- It provides a graphical web based interface for configuration.

What will a router do next on start-up after it has loaded its bootstrap routine?

- ***Look for an IOS and load it.***
- Look for a configuration and load it.
- Run the POST
- Prompt the user to enter setup mode

If the router has not loaded a configuration file and the administrator chooses not to enter setup mode, how can the router get a configuration?

- ***The router starts in user exec mode. The administrator can go to privileged exec mode, then global configuration mode, and type in the configuration one command at a time.***
- The router starts in user exec mode. The administrator will need to know the enable secret in order to get to privileged exec mode, then goes to global configuration mode, and will then type in the configuration.
- The router starts in user exec mode. The administrator can go to privileged exec mode, then paste in a previously saved configuration from a text file.
- ***The router starts in user exec mode. The administrator can go to privileged exec mode, then global configuration mode, and transfer in a text configuration file using Hyperterminal.***
- The administrator will not know the default login or enable passwords and will have to carry out a password recovery before gaining access and typing in the configuration commands.

What must be done before a router can be accessed via Telnet? (Choose 2)

- ***Configure an IP address on the relevant network interface and bring it up.***
- Configure an IP address on at least one vty line.
- Configure a password on the relevant network interface and give the login command.
- ***Configure a password on at least one vty line and give the login command.***
- Configure a password on the console line and give the login command.

What information does a router use when selecting a route for a packet?

- The host part of the source IP address.
- The network part of the source IP address.
- The host part of the destination IP address.
- ***The network part of the destination IP address.***
- The source MAC address.
- The destination MAC address.

When do you need to configure a clock rate on a router interface?

- When the interface is a serial DTE interface.
- ***When the interface is a serial DCE interface.***
- When the interface is connected to a service provider's CSU/DSU.
- When the interface is not using the default HDLC layer 2 protocol.

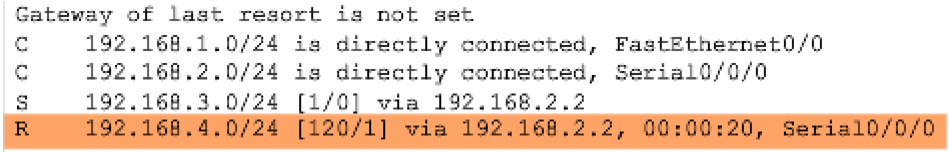
What will a router do after it has chosen the best route for a packet and identified the exit interface?

- Change the destination MAC address in the frame header to the address of the next hop router.
- Change the destination IP address in the packet header to the address of the next hop router.
- Encapsulate the packet in a new frame with a new source MAC address and destination MAC address.
- ***Encapsulate the packet in a new frame of the type required on the next hop.***

At which OSI layer(s) does a router operate?

- ***Layers 1, 2 and 3, though it is normally regarded as a layer 3 device because its specialist routing function is at layer 3.***
- Layers 1, 2 and 3, though it is normally regarded as a layer 2 device because it is able to split up collision domains.
- Layers 1, 2 and 3, though it is normally regarded as a layer 1 device because it is able to put signals on different types of medium.
- Layer 3 because its function is routing, which occurs at layer 3. Other devices manage all the functions at other layers.
- Layer 4 because routing depends mainly on port numbers.

A router has a route to network 192.168.4.0/24 as shown.

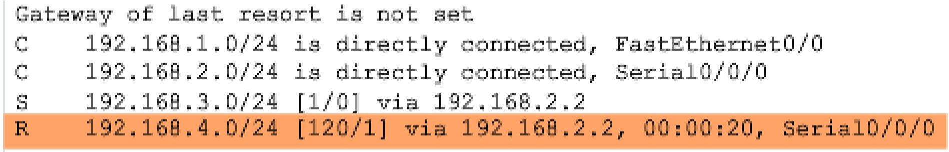


```
Gateway of last resort is not set
C    192.168.1.0/24 is directly connected, FastEthernet0/0
C    192.168.2.0/24 is directly connected, Serial0/0/0
S    192.168.3.0/24 [1/0] via 192.168.2.2
R    192.168.4.0/24 [120/1] via 192.168.2.2, 00:00:20, Serial0/0/0
```

How did it learn the route?

- From its interface configuration.
- The route was entered by an administrator.
- ***From another router.***
- Default configured by ISP.

A router has a route to network 192.168.4.0/24 as shown.

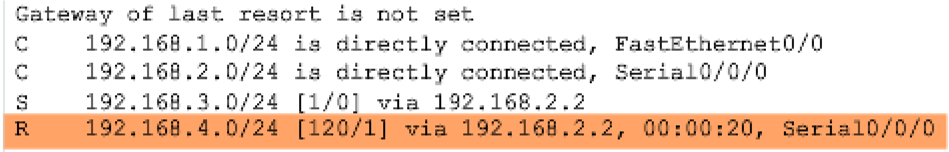


```
Gateway of last resort is not set
C    192.168.1.0/24 is directly connected, FastEthernet0/0
C    192.168.2.0/24 is directly connected, Serial0/0/0
S    192.168.3.0/24 [1/0] via 192.168.2.2
R    192.168.4.0/24 [120/1] via 192.168.2.2, 00:00:20, Serial0/0/0
```

An administrator configures a static route to 192.168.4.0/24, using the default administrative distance. What will happen?

- The new route will be added to the routing table and both routes to 192.168.4.0/24 will be used equally.
- ***The new route will be added to the routing table and the existing route will be removed.***
- The new route will be added to the routing table and the existing route will be kept in the table but not used.
- There will be a conflict and neither route will be used.

A router has a route to network 192.168.4.0/24 as shown.



```
Gateway of last resort is not set
C    192.168.1.0/24 is directly connected, FastEthernet0/0
C    192.168.2.0/24 is directly connected, Serial0/0/0
S    192.168.3.0/24 [1/0] via 192.168.2.2
R    192.168.4.0/24 [120/1] via 192.168.2.2, 00:00:20, Serial0/0/0
```

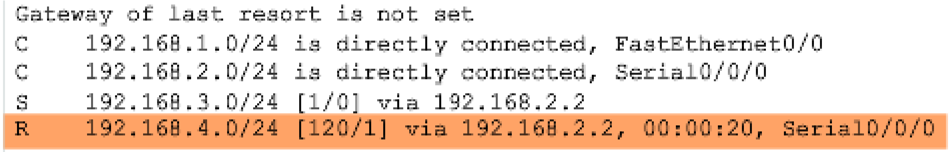
What is the number 120 given in the brackets [120/1] for the route to 192.168.4.0/24? (Choose 2)

- ***The administrative distance.***
- ***An indication of which route should be preferred where the router has learned routes to the same network using different routing protocols.***
- The metric.
- The number of hops to the destination.
- The speed of the link to the destination.

Which command would you give to check the configuration register settings?

- Show running-config
- Show startup-config
- Show flash
- ***Show version***

A router has a route to network 192.168.1.0/24 as shown.



```
Gateway of last resort is not set
C    192.168.1.0/24 is directly connected, FastEthernet0/0
C    192.168.2.0/24 is directly connected, Serial0/0/0
S    192.168.3.0/24 [1/0] via 192.168.2.2
R    192.168.4.0/24 [120/1] via 192.168.2.2, 00:00:20, Serial0/0/0
```

A packet arrives on interface Serial0/0/0 addressed to 192.168.1.56. When the router encapsulates the packet in a new frame, what address information will it put in the new frame?

- ***The MAC address of the host with IP address 192.168.1.56 as the destination and its own Fa0/0 MAC address as the source.***
- The MAC address of the next hop router as the destination and its own Fa0/0 MAC address as the source.
- The MAC address corresponding to IP address 192.168.2.2 as the destination and its own Fa0/0 MAC address as the source.
- The MAC address of the host with IP address 192.168.1.56 as the destination and the MAC address corresponding IP address 192.168.2.2 as the source.

Which two commands do you have to give in order to make any interface operate? (Choose 2)

- Description
- ***No shutdown***
- ***Ip address***
- Clock rate

What will happen if you do not configure a password on the console line?

- It will not be possible to access the router via the console line.
- The default console password of cisco will be used.
- ***It is possible to access the router via the console line without a password.***
- The enable password will be used instead of a line password.

What is the routing metric used for?

- ***If a router learns more than one route to the same destination and the routes have the same administrative distance then the route with the lowest routing metric will be used.***
- If a router learns more than one route to the same destination and the routes have the same administrative distance then the route with the highest routing metric will be used.
- If a router learns more than one route to the same destination and the routes have different administrative distances then the route with the lowest routing metric will be used.
- If a router learns more than one route to the same destination and the routes have different administrative distances then the route with the highest routing metric will be used.

How can a router split up broadcast domains?

- It forwards all broadcasts to the nearest switch.
- It converts all broadcasts to unicast messages before forwarding them
- ***It drops broadcast messages by default.***
- It drops all messages where the destination network is not in its routing table.

CCNA2 Chapter 2 Practice

What output would you expect from **show interface serial 0/0** if the administrator forgot to give the **no shutdown** command?

- Serial0/0 is up, line protocol is up
- Serial0/0 is down, line protocol is down
- Serial0/0 is up, line protocol is down
- ***Serial0/0 is administratively down, line protocol is down***
- Serial0/0 is down, line protocol is up

What output would you expect from **show interface serial 0/0** if the serial cable is faulty?

- Serial0/0 is up, line protocol is up
- ***Serial0/0 is down, line protocol is down***
- Serial0/0 is up, line protocol is down
- Serial0/0 is administratively down, line protocol is down
- Serial0/0 is down, line protocol is up

What output would you expect from **show interface serial 0/0** if the serial cable has been connected the wrong way round?

- Serial0/0 is up, line protocol is up
- Serial0/0 is down, line protocol is down
- ***Serial0/0 is up, line protocol is down***
- Serial0/0 is administratively down, line protocol is down
- Serial0/0 is down, line protocol is up

What output would you expect from **show interface serial 0/0** if the serial interface on the router at the other end has not been configured?

- Serial0/0 is up, line protocol is up
- ***Serial0/0 is down, line protocol is down***
- Serial0/0 is up, line protocol is down
- Serial0/0 is administratively down, line protocol is down
- Serial0/0 is down, line protocol is up

What output would you never expect from **show interface serial 0/0**?

- Serial0/0 is up, line protocol is up
- Serial0/0 is down, line protocol is down
- Serial0/0 is up, line protocol is down
- Serial0/0 is administratively down, line protocol is down
- ***Serial0/0 is down, line protocol is up***

When configuring a static route over a point to point link, why is it better to give the exit interface rather than the next hop IP address?

- Devices on a point to point link do not have IP addresses.
- The MAC address of the next hop router can be found more quickly.
- ***There is less processing because the router only needs to check the routing table once.***
- There is less processing because the router does not need to check the routing table.

When is it better to configure a static route by giving a next hop address rather than an exit interface?

- ***When the next hop is on a multi-access network***
- When the next hop is on a WAN link running the PPP protocol
- When the next hop is on a WAN link running the HDLC protocol
- When the next hop is on a serial cable and the router is at the DCE end.

What is recursive lookup?

- ***The router has to check through the routing table more than once in order to find a route to a destination.***
- The router makes use of every entry in the routing table before finding a route to a network.
- The router checks the routing table repeatedly but does not find a route to a network.
- The router checks the routing table but does not find the destination network, so it uses the default route.

What type of route has an administrative distance of 1 by default?

- A default route
- ***A static route***
- A RIP route
- A directly connected route

A route in the routing table is marked with *. What kind of route is this?

- ***A default route***
- A static route
- A dynamic route
- A directly connected route

What command could you give in order to find the model of a directly connected Cisco router?

- Show ip route
- Show ip neighbors

- ***Show cdp neighbors***
- Show ip interface detail

The RIP routing protocol has found a route to network 192.168.7.0/24 through serial 0/0 but there is also a static route to the same network through serial 0/1. Which route will be preferred and placed in the routing table?

- The RIP route through serial 0/0
- ***The static route through serial 0/1***
- Both routes will appear.
- Neither route will appear because there is a contradiction.

The RIP routing protocol has found a route to network 192.168.7.0/24 through serial 0/0 but there is also a static route to the same network through serial 0/1. At first the static route appears in the routing table, but later the RIP route appears instead. What is most likely to have happened?

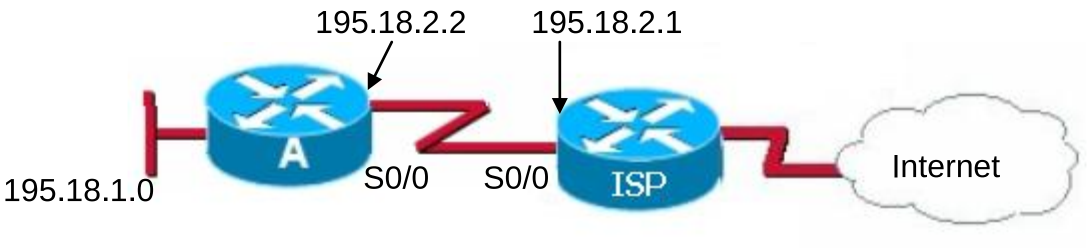
- The static route has timed out.
- The RIP route has been refreshed.
- ***A link on the static route has gone down.***
- The metric has been recalculated.

What information can you find from **show controllers serial 0/1** that you would not find from **show interfaces serial 0/1**?

- The IP address of the interface
- Whether the line is up or down
- Whether the protocol is up or down
- ***The type of cable used on the link***

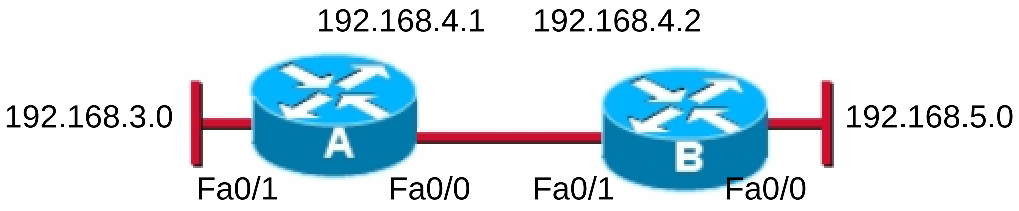
Router A has a serial link to Router B. Router B has been configured with a clock rate of 64000. The cable has been connected with the DTE end connected to Router B. Which of the following would you expect?

- The line protocol will be down and the link will not work.
- Router A will display a prompt asking for the clock rate to be configured.
- ***The show controllers command on router A will output “V.35 DCE cable, No clockrate”***
- The show controllers command on router B will output “No V.35 DCE cable”



Which configuration commands would enable the 195.18.1.0 network to communicate over the Internet?

- A(config)#ip route 195.18.1.0 255.255.255.0 serial 0/0
  ISP(config)#ip route 0.0.0.0 0.0.0.0 serial 0/0
- ***A(config)#ip route 0.0.0.0 0.0.0.0 serial 0/0***
  ISP(config)#ip route 195.18.1.0 255.255.255.0 serial 0/0
- A(config)#ip route 0.0.0.0 0.0.0.0 195.18.2.2
  ISP(config)#ip route 195.18.1.0 255.255.255.0 195.18.2.1
- A(config)#ip route 195.18.1.0 255.255.255.0 195.18.2.1
  ISP(config)#ip route 0.0.0.0 0.0.0.0 195.18.2.2



Which would be the preferred command to give the 192.168.3.0 network a static route to the 192.168.5.0 network?

- A(config)#ip route 192.168.5.0 255.255.255.0 Fa 0/0
- A(config)#ip route 192.168.5.0 255.255.255.0 Fa 0/1
- A(config)#ip route 192.168.5.0 255.255.255.0 192.168.4.1
- ***A(config)#ip route 192.168.5.0 255.255.255.0 192.168.4.2***

Routing has been configured as in the previous question. A host on network 192.168.3.0 pings a host on the 192.168.5.0 network, but the ping is unsuccessful. The routers can ping each other, and the hosts can both ping their local routers. Which is a possible cause of the problem?

- Router A does not have a route to 192.168.4.0.
- Router B does not have a route to 192.168.4.0.
- ***Router B does not have a route to 192.168.3.0.***
- Router B does not have a route to 192.168.5.0.

Which address would best summarize networks 172.30.0.0/24 and 172.30.1.0/24?

- 172.30.0.0/22
- ***172.30.0.0/23***
- 172.30.0.0/24
- 172.30.0.0/25

Which address would best summarize networks 172.30.4.0/24, 172.30.5.0/24, 172.30.6.0/24 and 172.30.7.0/24?

- 172.30.0.0/22
- 172.30.0.0/23
- ***172.30.4.0/22***
- 172.30.4.0/23

Which address would best summarize networks 192.168.3.0/28, 192.168.3.16/28, 192.168.3.32/28 and 192.168.3.48/28?

- ***192.168.3.0/26***
- 192.168.3.0/27
- 192.168.3.0/28
- 192.168.3.0/29

What is the purpose of a CSU/DSU device?

- ***It converts signals from the form required by the router to the form required on the service provider's network and vice versa.***
- It converts digital signals from the phone line to the analogue signals used by the router.
- It allows a router to put a clocking signal on a synchronous serial line.
- It provides a table of routes to destinations on the Internet.

Which command will show the IP addresses of interfaces and whether they are up or down but without showing statistics of packets sent and received?

- Show interfaces
- Show ip interfaces
- ***Show ip interface brief***
- Show controllers

What command would you give in order to display the following information?

```
C       192.168.2.0/24 is directly connected, Ethernet0/0
C       192.168.5.0/24 is directly connected, Serial0/0
R       192.168.3.0/24 [120/1] via 192.168.5.1, 00:00:03, Serial0/0
R       192.168.6.0/24 [120/2] via 192.168.5.1, 00:00:12, Serial 0/0
```

- ***RouterA# show ip route***
- RouterA# show ip interfaces
- RouterA# show routing table
- RouterA# show RIP routing

What does the letter C signify at the start of an entry in the routing table?

- The route to the network was discovered using RIP
- The network was discovered using CSPF
- ***The network is directly connected***
- The route to the network is closed

What is a static route?

- A route that does not often change with time
- ***A route that is manually configured by an administrator***
- A route to a destination on a LAN
- A route that can be used if all other routes are unavailable

Which of the following are advantages of static routing over dynamic routing? (Choose 2)

- It automatically adapts to changed network topologies
- ***It does not make demands on the processing power of the router***
- ***It is more secure because it does not reveal so much information about the network***
- It does not have to be configured again manually if links are removed

Static routes are often created to stub networks. What is a stub network?

- ***A network that is accessible only by one path***
- A network with a bus topology
- A network owned by one organisation
- A network that is not fully switched

Which of the following are correct ways of configuring a static route? (Choose 2)

- Router (config)# static route 192.168.7.0 255.255.255.0 s0/1
- Router (config)# static route 192.168.7.0 255.255.255.0 192.168.4.1
- ***Router (config)# ip route 192.168.7.0 255.255.255.0 s0/1***
- ***Router (config)# ip route 192.168.7.0 255.255.255.0 192.168.4.1***

What is the default administrative distance of a static route?

- 0
- ***1***
- 5

- 20
- 90
- 100
- 120

A static route is to be set up as a backup route to be used only if other routes are unavailable. How could this be done?

- Use the backup modifier command when setting the static route
- Use the outgoing interface and not the next hop address
- Set the administrative distance to 0
- ***Set the administrative distance to 255***

What are the two main functions of a router? (Choose 2)

- ***Path selection***
- Building an ARP table
- ***Packet switching***
- Keeping a table of host names

Where does the router find the destination address that it needs in order to select the best path?

- In the frame header
- In the frame trailer
- ***In the packet header***
- In the segment header
- In the data header

The **show ip route** command gives the following output.

```
C       192.168.2.0/24 is directly connected, Ethernet0/0
C       192.168.5.0/24 is directly connected, Serial0/0
C       192.168.1.0/24 is directly connected, Serial0/1
R       192.168.3.0/24 [120/1] via 192.168.5.1, 00:00:03, Serial0/0
R       192.168.6.0/24 [120/2] via 192.168.5.1, 00:00:12, Serial 0/0
S       192.168.4.0/24 [1/0] via 192.168.2.1
S*       0.0.0.0/0 is directly connected, Serial0/1
```

What routing table look-ups will be performed if a packet is addressed to 192.168.4.7?

- ***Match with 192.168.4.0/24, then match with 192.168.2.0/24, exit by Ethernet 0/0***
- Match with 192.168.4.0/24, then match with default route, exit by Serial0/1
- Match with 192.168.4.0/24, exit by Serial0/0
- Match with 0.0.0.0/0, exit by Serial0/1

CCNA2 Chapter 3 Practice

Which of the following is an exterior gateway routing protocol?

- RIP
- IGRP
- EIGRP
- OSPF
- ***BGP***
- IS-IS

Which of the following routing protocols are Cisco proprietary? (Choose 2)

- RIP
- ***IGRP***
- ***EIGRP***
- OSPF
- BGP
- IS-IS

Which of the following routing protocols are classless? (Choose all that apply)

- RIP v1
- ***RIP v2***
- IGRP
- ***EIGRP***
- ***OSPF v2***
- ***BGP v4***
- ***IS-IS***

An organization has a few small linked networks which have been addressed using VLSM. They have a mixture of Cisco and other routers which are quite old and not very powerful. Static routing could be appropriate, however the administrator has decided to use dynamic routing. The administrator is not experienced with routing protocols and wants something easy to configure and administer. Which protocol would you recommend?

- RIP v1
- ***RIP v2***
- IGRP
- EIGRP
- OSPF v2
- BGP v4

An organization has a large group of networks organized in a hierarchy and addressed using VLSM. They have a mixture of Cisco and other routers. All the routers are modern with powerful processors and large RAM capacity.

Bandwidth is an issue, and it is important that the routing protocol does not use too much bandwidth. The administrator is an experienced CCIE. Which protocol is the administrator most likely to choose?

- RIP v1
- RIP v2
- IGRP
- EIGRP
- ***OSPF v2***
- BGP v4

Which of the following routing protocols are classless? (Choose all that apply)

- RIP v1
- ***RIP v2***
- IGRP
- ***EIGRP***
- ***OSPF v2***
- ***BGP v4***
- ***IS-IS***

Which metric(s) does RIP use?

- ***Hop count***
- Bandwidth
- Cost
- Reliability
- Delay
- Load

Which metric(s) does EIGRP use by default? (Choose 2)

- Hop count
- ***Bandwidth***
- Cost
- Reliability
- ***Delay***
- Load

Which metric(s) does OSPF use in the Cisco implementation?

- Cost calculated using Hop count
- ***Cost calculated using Bandwidth***
- Cost calculated using Reliability
- Cost calculated using Delay
- Cost calculated using Load

What command would you give in order to display the following information?

```
C       192.168.2.0/24 is directly connected, Ethernet0/0
C       192.168.5.0/24 is directly connected, Serial0/0
R       192.168.3.0/24 [120/1] via 192.168.5.1, 00:00:03, Serial0/0
R       192.168.6.0/24 [120/2] via 192.168.5.1, 00:00:03, Serial 0/0
```

- ***RouterA# show ip route***
- RouterA# show ip interfaces
- RouterA# show routing table
- RouterA# show RIP routing

Which statements are true about the information in the following display? (Choose 3)

```
C       192.168.2.0/24 is directly connected, Ethernet0/0
C       192.168.5.0/24 is directly connected, Serial0/0
R       192.168.3.0/24 [120/1] via 192.168.5.1, 00:00:03, Serial0/0
R       192.168.6.0/24 [120/2] via 192.168.5.1, 00:00:03, Serial 0/0
```

- Two routing protocols are being used
- ***RIP is being used***
- ***Routes to two networks have been discovered using RIP***
- Routes to four networks have been discovered using RIP
- The route to 192.168.6.0 involves 120 hops
- The route to 192.168.6.0 involves 24 hops
- ***The route to 192.168.6.0 involves 2 hops***

A routing table shows the following.

```
C       192.168.2.0/24 is directly connected, Ethernet0/0
C       192.168.5.0/24 is directly connected, Serial0/0
R       192.168.3.0/24 [120/1] via 192.168.5.1, 00:00:03, Serial0/0
R       192.168.6.0/24 [120/2] via 192.168.5.1, 00:00:03, Serial 0/0
```

Which of the following IP addresses could be addresses of interfaces on this router? (Choose 3)

- ***192.168.2.1***
- ***192.168.2.2***
- 192.168.3.1
- 192.168.3.2
- 192.168.5.1
- ***192.168.5.2***
- 192.168.6.1
- 192.168.6.2

A routing table shows the following.

```
C       192.168.2.0/24 is directly connected, Ethernet0/0
C       192.168.5.0/24 is directly connected, Serial0/0
R       192.168.3.0/24 [120/1] via 192.168.5.1, 00:00:03, Serial0/0
R       192.168.6.0/24 [120/2] via 192.168.5.1, 00:00:03, Serial 0/0
```

How did the route to 192.168.5.0 get into the routing table?

- It was configured as a static route by an administrator.
- It was learned using the RIP routing protocol.
- An address on the network was configured on Ethernet port 0/0.
- ***An address on the network was configured on Serial port 0/0.***

A router has discovered two routes to the 201.34.5.0 network. One was discovered using RIP, and has a metric of 3. The other was discovered using EIGRP and has a metric of 108. Which route will go into the routing table?

- The RIP route because it has a lower metric.
- ***The EIGRP route because it has a lower administrative distance.***
- Both routes will go in but the RIP route will be preferred.
- Both routes will go in but the EIGRP route will be preferred.
- Both routes will go in and the router will load balance.

What type of routing protocol is RIP? (Choose 2)
- ***Internal***
- External
- Border
- ***Distance vector***
- Link state

What type of routing protocol is OSPF? (Choose 2)
- ***Internal***
- External
- Border
- Distance vector
- ***Link state***

What type of routing protocol is EIGRP? (Choose 2)
- ***Internal***
- External
- Border
- ***Distance vector***
- Link state

What does a routing protocol allow a router to do?
- ***Build up its routing table by sharing information with other routers***
- Read IP destination addresses and forward packets
- Translate between MAC addresses and IP addresses
- Ensure that all packets reach their destinations
- Allocate IP addresses to directly connected hosts

What does the letter C signify at the start of an entry in the routing table?
- The route to the network was discovered using RIP
- The network was discovered using CSPF

- ***The network is directly connected***
- The route to the network is closed

What is a static route?

- A route that does not often change with time
- ***A route that is manually configured by an administrator***
- A route to a destination on a LAN
- A route that can be used if all other routes are unavailable

What state is a network in when all routers have consistent routing information?

- enabled
- ***converged***
- concurrent
- fully routed

Link state routing protocols are now being used more widely than they were in the past. What factors might have allowed this? (Choose 2)

- ***Modern routers have the greater processing power needed by link state routing protocols***
- ***Modern routers have the greater memory capacity needed by link state routing protocols***
- Modern WAN links have the greater bandwidth needed by link state routing protocols
- Modern networks are less likely to have multiple paths to the same destination

Which type of routing protocol lets a router build up a topological database that shows how all the routers are connected?

- Distance vector
- ***Link state***
- Border gateway
- Balanced hybrid

What is the name given to a group of networks under the control of a single organisation and having a 16 bit identifier number?

- Local Area Network
- Metropolitan Area Network
- Organisation Unique Indentifier
- ***Autonomous system***

Which statements are true of routing metrics? (Choose 2)

- ***Routing metrics are used to compare the paths found by one routing protocol and decide which path goes into the routing table..***
- Routing metrics are used to compare the paths found by different routing protocols and decide which path goes into the routing table.

- If a routing protocol finds several routes to one destination then the route with the largest metric goes into the routing table.
- ***If a routing protocol finds several routes to one destination then the route with the smallest metric goes into the routing table.***
- All routing protocols use the same metrics.

Which statements are true of administrative distance? (Choose 2)

- Administrative distance is used to compare the paths found by one routing protocol and decide which path goes into the routing table.
- ***Administrative distance is used to compare the paths found by different routing protocols and decide which path goes into the routing table.***
- ***By default, a static route has a lower administrative distance and will be preferred over a dynamic route.***
- By default, a static route has a higher administrative distance and will be preferred over a dynamic route.
- The administrative distance of a static route cannot be changed by the administrator.
- All routing protocols have the same administrative distance.

Which routes will have an administrative distance of 1?

- Directly connected routes.
- ***Static routes where the administrator does not specify an administrative distance.***
- Static routes that the administrator configures to be kept in reserve for use when dynamic routes go down.
- Routes learned using RIP
- Routes learned using OSPF
- Routes learned using EIGRP

A routing table contains the following line.
? 192.168.7.0/24 [110/127] via 192.168.8.1, 00:00:03, Serial0/0
Which letter would you expect to see at the start of the line instead of the ?

C
D
E
R
O
S

Why is a classful routing protocol unable to support VLSM?

- It sends routing table updates that contain only the default class subnet masks.
- Directly connected networks cannot be subnetted.

- ***It does not send subnet mask information in routing updates so the default class masks or the masks used on directly connected subnets have to be assumed.***
- It does not send subnet mask information in routing updates so that subnetting cannot be used.

Which of the following algorithms is used by the RIP routing protocol?

- DUAL
- ***Bellman-Ford***
- Open shortest path first

Which of the following algorithms is used by the EIGRP routing protocol?

- ***DUAL***
- Bellman-Ford
- Open shortest path first

Which of the following algorithms is used by link state routing protocols?

- DUAL
- Bellman-Ford
- ***Open shortest path first***

An administrator is in charge of a group of networks that have a single connection to the outside, via an ISP. Which would be good reasons for using static routing across the link to the ISP? (Choose 2)

- Adjusts better to changes on the Internet.
- ***More secure.***
- ***Less use of bandwidth on the link.***
- The gateway router will not need to be configured.

Fast convergence is important on a group of networks, but the administrator has chosen to use EIGRP as the routing protocol. Is this a sensible choice?

- Yes, because EIGRP is a distance-vector routing protocol and distance vector routing protocols are fast to converge.
- Yes, because EIGRP is a link state routing protocol and link state routing protocols are fast to converge.
- ***Yes. Although distance-vector routing protocols are typically show to converge, EIGRP has features that make it fast to converge.***
- No, because EIGRP is a distance-vector routing protocol and distance vector routing protocols are slow to converge.
- No, because EIGRP is a link state routing protocol and link state routing protocols are slow to converge.

What is equal cost load balancing?

- Two different routing protocols discover different routes to the same destination. They have the same metric, and both routes are put into the routing table and used.
- ***A routing protocol discovers two different routes to the same destination. They have the same metric, and both routes are put into the routing table and used.***
- A routing protocol discovers two different routes with the same metric to different destinations. Both routes are put into the routing table and used.
- A router has discovered two routes to the same destination. Both go via the ISP at a standard fixed payment, so both routes are used.

Which routing protocol can be configured to allow unequal cost load balancing?

- RIP v1
- RIP v2
- IGRP
- ***EIGRP***

Why is it undesirable to have a network that converges slowly?

- Routers will not forward packets addressed to remote networks.
- Routers will send all packets on the default route.
- ***Routers may forward packets through incorrect ports because the routing table is out of date.***
- Routers will use only static routes because all dynamic routes are removed from the routing table.

Which statement is true of networks that have converged?

- ***Distance vector routing protocols will send their entire routing tables as regular updates to immediate neighbours so they use more bandwidth than link state routing protocols.***
- Link state routing protocols will send their entire routing tables as regular updates to immediate neighbours so they use more bandwidth than distance vector routing protocols.
- Distance vector routing protocols will send their entire routing tables as regular updates to all routers in the autonomous system so they use more bandwidth than link state routing protocols.
- Link state routing protocols will send their entire routing tables as regular updates to all routers in the autonomous system so they use more bandwidth than distance vector routing protocols.

CCNA2 Chapter 4 Practice

Which of the following are distance vector routing protocols? (Choose 2)

- ***RIP.***
- OSPF
- IS-IS
- BGP.
- ***EIGRP***.
- EGP

Which routing protocol can be used only on Cisco routers?

- RIP.
- OSPF
- IS-IS
- BGP.
- ***EIGRP***.
- EGP

Which routing protocols can support VLSM? (Choose all that apply)

- RIP v1
- ***RIP v2***
- ***OSPF***
- ***IS-IS***
- IGRP
- ***EIGRP***.

How often does RIP v2 send out periodic routing updates?

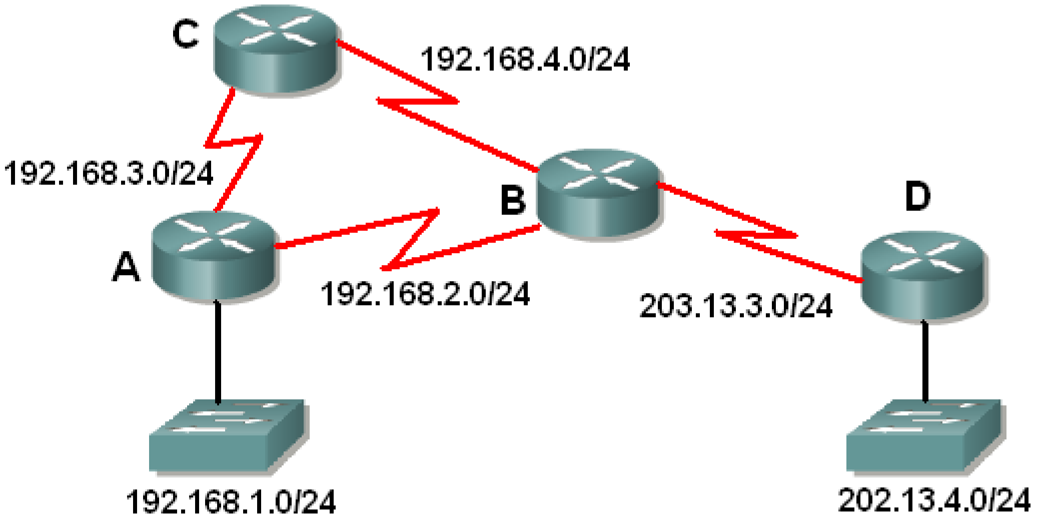
- ***Every 30 seconds***
- Every 60 seconds
- Every 90 seconds
- Every 120 seconds

Which are characteristics of a typical distance vector routing protocol? (Choose 2)

- ***Slow to converge***
- Fast to converge
- ***Sends most of routing table in an update***
- Sends only latest changes in an update

What information does a distance vector routing protocol have about the group of networks where the protocol is running?

- It builds up a picture of all routers and links in the group of networks.
- It knows only about its directly connected neighbours.
- It knows which routers a packet must pass through to reach the destination networks that it has discovered.
- ***It knows which port to use to reach destination networks and a measure of the distance to each network.***

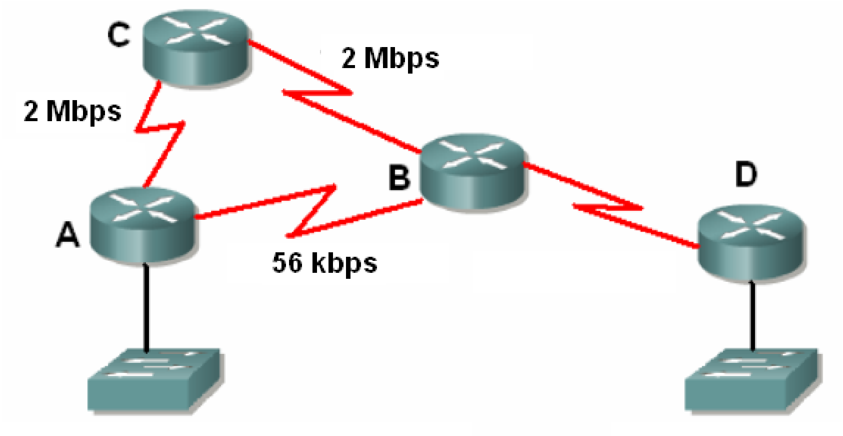


The routers are running RIP v2.
Router D sends an update to Router B with the information that the link to network 202.13.4.0 is down. Which of the following is true?

- Router B will include the information in its updates to routers A, C and D.
- Router B will include the information in its updates to routers A and D.
- Router B will include the information in its updates to routers A and C.
- Router B will not include the information in its updates.

A router is running RIP v1. What regular routing updates will it send?

- ***A broadcast of its full routing table to its immediate neighbors.***
- A broadcast of its full routing table to all RIP routers in the network group.
- Unicast messages of its full routing table to known neighbours.
- Limited updates containing only information about recent changes, broadcast to all routers.
- Limited updates containing only information about recent changes, directed to routers that need the information.



If RIP v1 and EIGRP were both running on the networks in the diagram, why would they choose different routes for forwarding a packet from A to D?

- Because they have different administrative distances.
- ***Because RIP uses hop count as its metric and EIGRP uses a metric where bandwidth is important in the calculation.***
- Because RIP learns only about one path and EIGRP learns about alternative paths.
- Because RIP v1 is classful and EIGRP is classless.

What happens to the routing table when a router is switched off?

- The information is saved in flash memory.
- The information is automatically saved in NVRAM.
- There will be a prompt to remind the administrator to save the information to NVRAM.
- ***The information is lost.***

What is a triggered update?

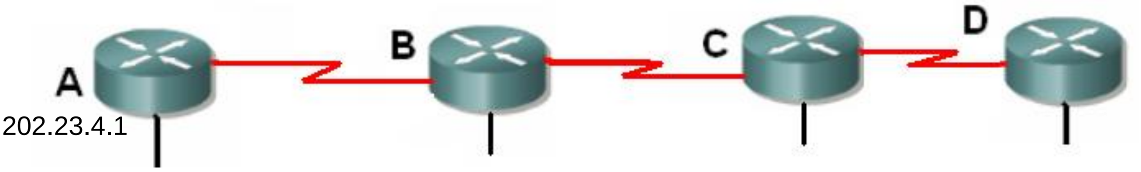
- A regular timed update, triggered by the update timer.
- ***An update sent in response to some change in the network topology, in addition to the regular updates.***
- An update of the type sent by link-state routing protocols, but not by distance vector routing protocols.
- An update sent in response to a request from a neighbour router.

What is the purpose of triggered updates in RIP?

- They help to reduce use of bandwidth.
- ***They help to speed up convergence.***
- They help routers to select more efficient routes.
- They ensure that updates are sent only to the right destinations.

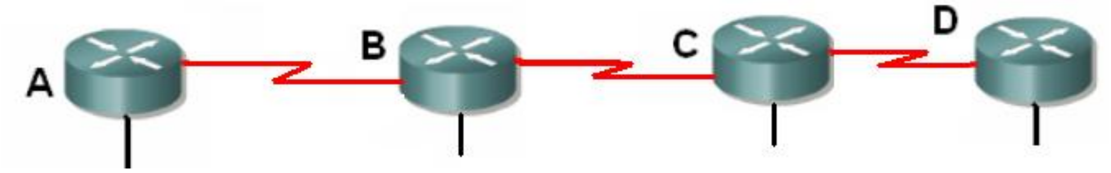
When a router is switched on after some down time, what routes will appear in the routing table before it receives any updates from neighbours?

- All the routes from the old routing table that were saved before the router was switched off.
- No routes will appear until an update is received.
- A directly connected route will appear for the network attached to each router interface.
- ***A route will appear for each network connected to an active interface with an IP address configured, and for any configured static routes.***



All routers are using RIP. Router B's routing table shows a path to network 202.23.4.0 with a hop count of 1. Router B sends a routing update to Router C. What happens to the hop count for network 202.23.4.0?

- It is shown in Router C's routing table just as it was in Router B's.
- It is decremented by 1 and shown in Router C's routing table.
- ***It is incremented by 1 and shown in Router C's routing table.***
- Router C will ignore it and calculate its own hop count.
- Router C will not show the route to 202.23.4.0 in its routing table.



Router C has learned a RIP route to 202.23.4.0 from router B. Router C now sends an update to router B. What happens?

- ***Under the split horizon rule, router C will not include the route to 202.23.4.0 in its update.***
- Router C will include the route to 202.23.4.0 in its update, but decrease the hop count by 1.
- Router B will wait until its holddown timer expires before accepting the information in the update from C.
- Router B will ignore the information about the route, but pass it on unchanged to router A.

Why is the RIP update timer altered by a small random time whenever it is reset?

- To reduce the use of bandwidth by sending fewer updates.
- ***To reduce the risk of congestion and collisions if several routers start up at the same time and send updates.***
- To speed up convergence.
- To ensure that routers that are already operating have a chance to send their updates first.

What metric does RIP use to indicate a route that has become invalid?

- 0
- 15
- ***16***
- 99
- 100

Both RIP and EIGRP are enabled on all routers. A route to 202.23.4.0 is shown in Router A's routing table. Using default settings, will it be the route discovered by RIP or the route discovered by EIGRP?

- RIP because it has a greater administrative distance than EIGRP
- RIP because it has a smaller administrative distance than EIGRP
- EIGRP because it has a greater administrative distance than RIP
- ***EIGRP because it has a smaller administrative distance than RIP***

When is a distance vector network said to be converged?
- When all routers have identical routing tables
- ***When all routers have consistent routing tables***
- When all links and devices are fully functional
- When routing updates are being exchanged

What makes EIGRP unlike a typical distance vector routing protocol? (Choose 2)

- ***It is fast to converge.***
- It broadcasts its complete routing table to neighbours.
- ***It sends information about changes, but not complete routing tables.***
- It uses more bandwidth.

Which of the following are mechanisms used by distance vector routing protocols to avoid routing loops? (Choose all that apply.)

- ***Count to infinity***
- ***Route poisoning***
- Administrative distance
- ***Split horizon***

- Update timer
- ***Holddown timer***

Router B is running RIP. It uses route poisoning to alert other routers that the link to 192.168.2.0 has gone down. What does it do?

- It leaves 192.168.2.0 out of its next update.
- ***It advertises the route to 192.168.2.0 with a metric of 16.***
- It advertises the route to 192.168.2.0 with an administrative distance of 255.
- It advertises an alternative route with a larger hop count to 192.168.2.0.

What will EIGRP do if its best calculated route to a destination passes through 16 routers?

- It will detect that the route is invalid.
- ***It will install the route in its routing table because EIGRP does not use hop count as a metric or set a limit of 16 hops.***
- It will advertise the route to its neighbours with a hop count of 17.
- EIGRP does not use hop count as a metric and therefore it will not detect this route.

Why is fast convergence a desirable characteristic of a routing protocol?

- Routers will not forward packets until the network is converged.
- Converged networks provide shorter and more efficient routes.
- ***Routers may have incorrect information in their routing tables if the network is not yet converged.***
- Once the network is converged, the routers will no longer need to send routing updates.

What would happen to a packet caught in a routing loop if all the distance vector mechanisms for avoiding such loops failed?

- It would loop endlessly, taking up bandwidth on the networks.
- ***Eventually the TTL field in its packet header would fall to 0 and the packet would be dropped.***
- Eventually the packet would reach the edge of the autonomous system and be dropped.
- A router receiving the packet for a second time would automatically drop it.

Which routing algorithm does EIGRP use?

- Bellman-Ford
- ***DUAL***
- Dijkstra
- Shortest Path First

How can you identify an EIGRP route in a routing table?

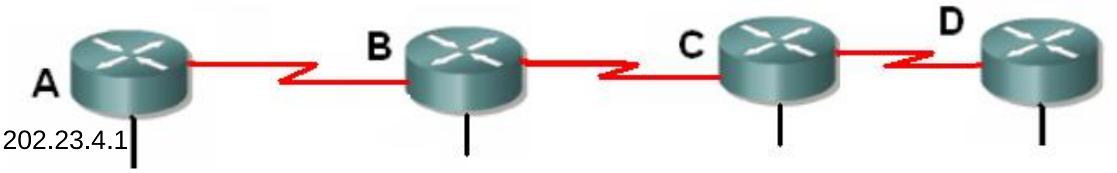
- It is marked with E
- ***It is marked with D***
- It is marked with R
- It is marked with I

Why might RIP be preferred to EIGRP for a small network with simple topology?

- RIP uses less bandwidth
- RIP is less prone to routing loops
- RIP has a more efficient routing metric
- RIP has a more efficient routing algorithm
- ***RIP is simple to configure and administer***

What is the name given to the feature of RIP that limits the valid metric to 15 and helps to avoid routing loops?

- ***Count to infinity***
- Route poisoning
- Administrative distance
- Split horizon
- Update timer
- Holddown timer



The routers are using RIP and network 202.23.4.0 has just been connected to router A. How is router D most likely to become aware of a route to 202.23.4.0?

- Through a regular broadcast update from A.
- Through a triggered update from A.
- Through a regular broadcast update from C.
- ***Through a triggered update from C.***

Router B has a route that it learned from A in its routing table. The latest update from A does not include the route. What does Router B do?

- Immediately removes the route from its routing table and informs other routers.
- Does nothing until it receives notification that the route is back up.
- ***Sets a hold-down timer and waits for it to expire before marking the route as down***

- Sends a message back to the source of the information asking for confirmation

Router B has a route that it learned from A in its routing table. Router A is no longer including this route in updates. How long will it be by default before Router B removes the route from its routing table?

- 60 seconds – it waits for two updates to come.
- 180 seconds – it waits for the holddown timer to expire.
- 180 seconds – it waits for the invalid timer to expire.
- ***240 seconds – it waits for the flush timer to expire***

Where would RIP v2 be a better choice than RIP v1? (Choose 2)

- On a large hierarchical network.
- ***Where authentication is needed.***
- Where fast convergence is needed.
- ***Where different sized subnets have been used.***

An administrator displays the routing table and finds that it includes the following information:
192.168.1.0/24 [120/3] via 203.13.3.2, 00:00:10, serial 0/0
What routing protocol is being used, assuming that all values are defaults?

- ***RIP***
- IGRP
- OSPF
- EIGRP
- BGP

Router B has received an update suggesting that the route to 192.168.9.0 is down. It has set a holddown timer on the route. What event will cause the holddown timer to be removed?

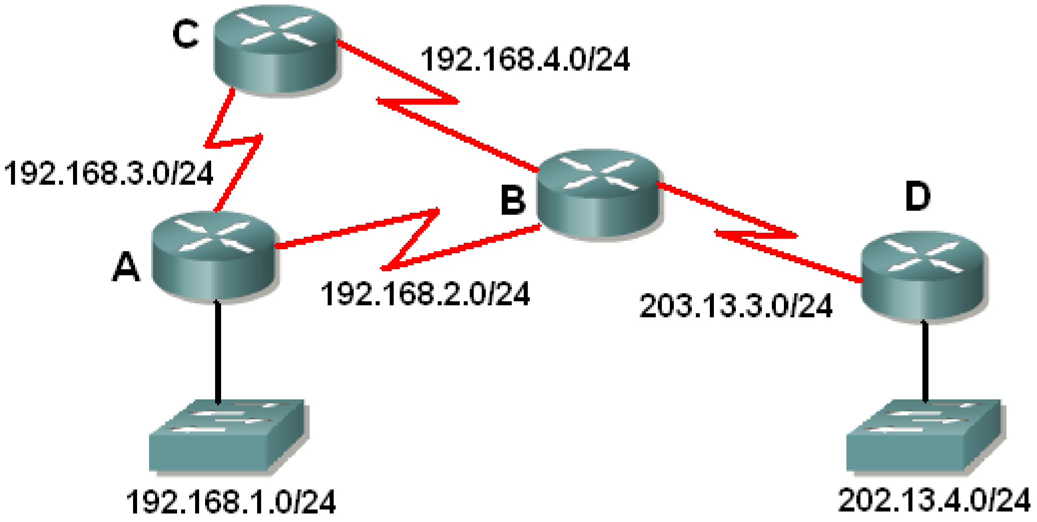
- An update arrives containing a new route to 192.168.9.0 with a greater metric.
- ***An update arrives containing a new route to 192.168.9.0 with a smaller metric.***
- An update arrives and the route to 192.168.9.0 is not included.
- A packet arrives addressed to a host on the 192.168.9.0 network.

Which RIP timer expires and causes a route to be given a metric of 16?

- Update timer
- Holddown timer
- ***Invalid timer***
- Flush timer

CCNA2 Chapter 5 Practice

Diagram 1



Refer to diagram 1. Which set of commands should you use to configure RIP on router B to advertise all attached networks.

- RouterB(config)# **router rip**
  RouterB(config)# **network 192.168.2.0**
  RouterB(config)# **network 192.168.4.0**
  RouterB(config)# **network 203.13.3.0**
- *RouterB(config)# **router rip***
  *RouterB(config-router)# **network 192.168.2.0***
  *RouterB(config-router)# **network 192.168.4.0***
  *RouterB(config-router)# **network 203.13.3.0***
- RouterB(config)# **router rip**
  RouterB(config-router)# **network 192.168.2.0 255.255.255.0**
  RouterB(config-router)# **network 192.168.4.0 255.255.255.0**
  RouterB(config-router)# **network 203.13.3.0 255.255.255.0**
- RouterB# **config router rip**
  RouterB(config-router)# **network 192.168.2.0**
  RouterB(config-router)# **network 192.168.4.0**
  RouterB(config-router)# **network 203.13.3.0**

Refer to diagram 1.
Router D sends an update to Router B with the information that the link to network 202.13.4.0 is down. Which of the following is true?

- Router B will include the information in its updates to routers A, C and D.
- Router B will include the information in its updates to routers A and D.
- *Router B will include the information in its updates to routers A and C.*
- Router B will not include the information in its updates.

Refer to diagram 1
All routers are using RIP. Router B’s routing table shows a path to network 202.23.4.0 with a hop count of 1. Router B sends a routing update to Router C. What happens to the hop count for network 202.23.4.0?

- It is shown in Router C’s routing table just as it was in Router B’s.
- It is decremented by 1 and shown in Router C’s routing table.
- *It is incremented by 1 and shown in Router C’s routing table.*
- Router C will ignore it and calculate its own hop count.
- Router C will not show the route to 202.23.4.0 in its routing table.

Refer to diagram 1.
RIP is used as the routing protocol on all routers. A packet is sent from network 192.168.1.0 to network 202.13.4.0. Will the packet pass through router C?

- *No. There is a path with a lower hop count that avoids router C.*
- Perhaps. RIP will perform load balancing among all available routes.
- Perhaps. It depends on the bandwidths of the serial links.
- Yes. Router C is part of the autonomous system.

Refer to diagram 1.
RIP is used on all routers. The route to network 202.13.4.0 goes down. How will Router D show this in its routing updates?

- It will set the hop count to 255
- It will set the hop count to 15
- *It will set the hop count to 16*
- It will set the administrative distance to 255
- It will leave the network out of its next routing update

An administrator gives the commands:
RouterA(config)# router rip
RouterA(config-router)# no network 192.168.1.0
What is the effect of these commands?

- Router A will no longer run RIP
- Router A will not accept packets from network 192.168.1.0
- The connection to 192.168.1.0 will be administratively down
- *Router A will not advertise network 192.168.1.0 in its routing updates*

An administrator wants to disable RIP routing before enabling EIGRP. Which command will disable RIP?

- ***RouterA(config)# no router rip***
- **RouterA# no debug rip**
- **RouterA(config)# disable router rip**
- **RouterA(config)# router rip end**

- **RouterA(config)# router rip shutdown**

What command would you give to display the contents of the routing table?
RouterA# show routing table
RouterA# show routes
RouterA# show ip route
RouterA(config)# show routing table
RouterA(config)# show routes
RouterA(config)# show ip route

An administrator displays the routing table and finds that it includes the following information:
192.168.1.0/24 [120/3] via 203.13.3.2, 00:00:10, serial 0/0
When is the next routing update due, assuming that all default values are used?

- In 10 seconds
- *In 20 seconds*
- In 30 seconds
- In 50 seconds
- In 80 seconds
- In 90 seconds

23
Which commands could you use to find the administrative distance of the routing protocol and when the last update was received or when the next is due? (Choose 2)

- *RouterA# show ip route*
- RouterA(config)# show ip route
- *RouterA# show ip protocols*
- RouterA(config)# show ip protocols
- RouterA# show routing updates
- RouterA(config)# show routing updates
- RouterA# router rip
- RouterA(config)# router rip

What command should you give in order to configure a static route to network 192.168.4.0 via a next-hop router with interface 192.168.2.1?

- Router(config)# ip static 192.168.4.0 255.255.255.0 192.168.2.1
- *Router(config)# ip route 192.168.4.0 255.255.255.0 192.168.2.1*
- Router(config)# ip static route 192.168.4.0 255.255.255.0 192.168.2.1
- Router(config)# static route 192.168.4.0 255.255.255.0 192.168.2.1
- Router(config-router)# ip 192.168.4.0 255.255.255.0 192.168.2.1

What command should you give in order to configure a default route via a next-hop router with interface 192.168.4.1?

- Router(config)# ip static 0.0.0.0 255.255.255.255 192.168.4.1
- *Router(config)# ip route 0.0.0.0 0.0.0.0 192.168.4.1*
- Router(config)# ip static route 0.0.0.0 255.255.255.255 192.168.4.1
- Router(config)# static route 0.0.0.0 0.0.0.0 192.168.4.1

- Router(config-router)# ip 0.0.0.0 0.0.0.0 192.168.4.1

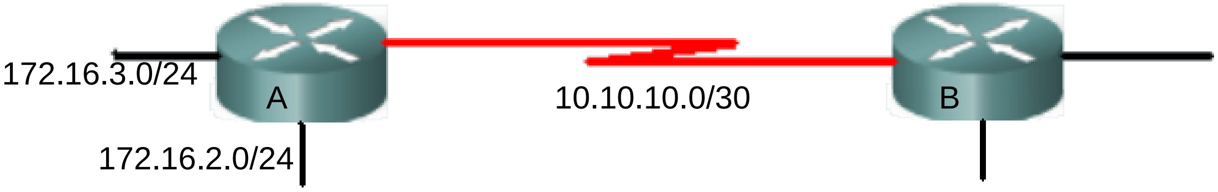
Which statements are true about the command **debug ip rip**? (Choose 3)

- It is entered in global configuration mode
- It is entered in router configuration mode
- *It is entered in privileged exec mode*
- *It shows routing updates as they are sent and received*
- It shows updates that are received, but not those that are sent
- It should be left on at all times so that you can check the working of RIP
- *It should be switched off after use to conserve resources*

RIP discovers four routes to a destination network, and all of them have the same number of hops. What will the router do with packets addressed to that network?

- Drop them
- Send them all by the fastest route
- Send them all by the route that was discovered first
- *Use load balancing, sending packets by each route in turn*
- Use load balancing, but send more packets on the faster routes
- Split each packet into four and send the pieces by different routes

Diagram 2



See Diagram 2. The two routers are running RIP v1. What will router A advertise to router B?

- 172.16.2.0 and 172.16.3.0
- 172.16.2.0
- *172.16.0.0*
- 172.0.0.0

See Diagram 2. Which address should you NOT use when addressing the LANs connected to Router B?

- *172.16.4.0/24*
- 172.17.3.0/24
- 172.31.255.0/24
- 192.168.1.0/24
- 192.168.128.0/24

See Diagram 2. Which is the correct way of configuring Router A to use RIP v1?

- A(config)# **router rip**
  A(config-router)# **network 172.16.2.0**
  A(config-router)# **network 172.16.3.0**
  A(config-router)# **network 10.10.10.0**
- *A(config)#* ***router rip***
  A(config-router)# ***network 172.16.0.0***
  A(config-router)# ***network 10.0.0.0***
- A(config)# **router rip**
  A(config-router)# **network 172.16.2.0**
  A(config-router)# **network 172.16.3.0**
- A(config)# **router rip**
  A(config-router)# **network 172.16.0.0**
  A(config-router)# **network 10.10.0.0**

A router has network 192.168.5.0 connected to interface FastEthernet 0/0. How could you stop routing updates from being sent through interface FastEthernet 0/0 while still including 192.168.5.0 in updates?

- A(config)#**no router rip**
- A(config)#**int fa 0/0**
  A(config-if)#**no router rip**
- A(config)#**router rip**
  A(config-router)#**no network 192.168.5.0**
- *A(config)#* ***router rip***
  *A(config-router)#****passive interface fa0/0***
- A(config)# **router rip**
  A(config-router)#**no interface fa0/0**

Which command will let you watch RIP updates being sent and received?

- show ip route
- show ip protocols
- show ip updates
- debug rip
- *debug ip rip*
- debug rip updates

A routing table includes the following line. What is the meaning of the 4 in [120/4]?
R 192.168.1.0/24 [120/4] via 192.168.4.1, 00:00:20, Serial0/0

- *It is the routing metric.*
- It is the administrative distance.
- It is the time in seconds since the last routing update.
- It is a way of writing the subnet mask.

Which routing algorithm does RIP v1 use?

- DUAL
- Shortest path first
- *Bellman-Ford*
- Dijkstra

Where would RIP v1 would be a suitable choice of routing protocol?

- On networks where use of bandwidth is a major issue.
- *On small networks where all subnets use the same subnet mask.*
- On large hierarchical networks where subnetting is not used.
- On small networks where VLSM is used to subnet a class C network.

Which statement is true of RIP v1?

- RIP v1 is one of the oldest routing protocols and is now no longer used.
- RIP v1 can only be used on networks containing fewer than 15 routers.
- RIP v1 needs routers with fast processors and plenty of RAM.
- *RIP v1 does not send subnet mask information in its routing updates.*
- RIP v1 is preferred for efficient networks because it used little bandwidth,
- RIP v 1 converges more quickly than other routing protocols.

An administrator is configuring RIP v1 and enters the commands **network 172.16.4.0** and **network 172.16.5.0** by mistake instead of **network 172.16.0.0**. What will appear in the configuration when the administrator gives the **show run** command?

- The network command will not be shown because the router will reject the command.
- The configuration will show **network 172.16.4.0** and **network 172.16.5.0** but these networks will not be included in updates.
- The configuration will show **network 172.16.4.0** because the router will summarize using /25 to include both networks.
- *The configuration will show **network 172.16.0.0** because the router will summarize to the class boundary.*
- The configuration will show **network 172.0.0.0** because the router will summarize to the first octet.

A group of networks with 6 routers are connected to an ISP by a single link from a gateway router. What is the preferred way of routing across the link?

- Configure RIP v1 between the gateway router and the ISP.
- Configure a static route on the gateway router to the ISP address. The ISP will have a static route back to the gateway router.
- Configure a default route to the ISP on every router. The ISP will have a static route back to each network.

- *Configure a default route to the ISP on the gateway router and use the* ***default information originate*** *command to propagate the route. The ISP will have a summarized static route back to the group of networks.*
- Configure a default route to the ISP on the gateway router and configure a static route to the ISP on the other routers. The ISP will have a default route back to the gateway router.

Which command will show whether a router is sending RIP v1 or RIP v2 updates and whether any interfaces have been configured as passive?

- Show ip route
- *Show ip protocols*
- Show ip rip
- Show version
- Debug ip rip

How are RIP routing updates sent?

- They are layer 3 messages and are encapsulated directly into frames.
- They are encapsulated into TCP segments.
- *They are encapsulated into UDP segments.*
- They are encapsulated into SNMP segments.

What is the default setting of the RIP update timer?

- *30 seconds*
- 60 seconds
- 120 seconds
- 180 seconds
- 240 seconds

What is the default setting of the RIP invalid timer?

- 30 seconds
- 60 seconds
- 120 seconds
- *180 seconds*
- 240 seconds

What is the default setting of the RIP flush timer?

- 30 seconds
- 60 seconds
- 120 seconds
- 180 seconds
- *240 seconds*

CCNA2 Chapter 6 Practice

What is a name for routing protocols that support VLSM and CIDR?

- Interior routing protocols
- Exterior routing protocols
- Distance vector routing protocols
- ***Classless routing protocols***

Which subnet mask would produce a subnet with up to 30 host addresses?

- 255.255.255.192
- ***255.255.255.224***
- 255.255.255.240
- 255.255.255.248
- 255.255.255.252

The class C networks 200.2.0.0/24, 200.2.1.0/24, 200.2.2.0/24 and 200.2.3.0/24 are summarized as 200.2.0.0/22. What name is given to 200.2.0.0/22?

- Subnet
- ***Supernet***
- Default route
- Groupnet

192.168.1.0 is subnetted with subnet mask /28.
Which of the following is a subnet address?

- 192.168.1.38
- 192.168.1.60
- 192.168.1.100
- 192.168.1.140
- ***192.168.1.176***

192.168.1.0 is subnetted with subnet mask /27.
Which of the following is a broadcast address?

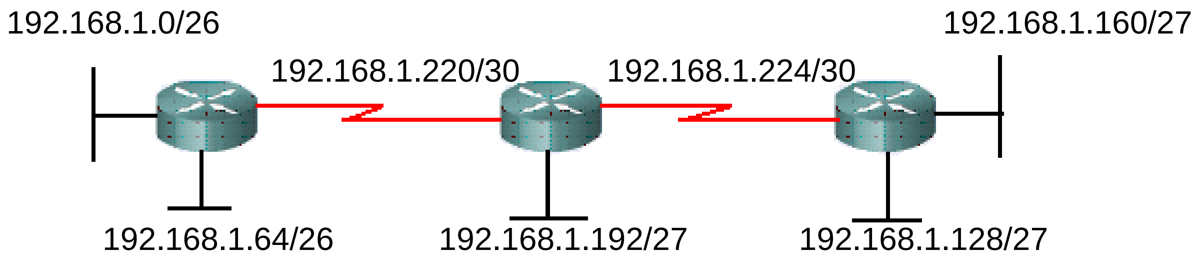
- 192.168.1.33
- 192.168.1.59
- ***192.168.1.95***
- 192.168.1.129
- 192.168.1.158

172.16.0.0/16 is subnetted with subnet mask /22.
Which of the following is a broadcast address?

- 172.16.12.255
- 172.16.21.255
- 172.16.38.255
- ***172.16.47.255***
- 172.16.53.255

A point-to-point link has been given the subnet 192.168.7.240/28. How many host addresses are wasted?

- 4
- ***12***
- 28
- 44
- 60



Is there anything wrong with this addressing scheme?

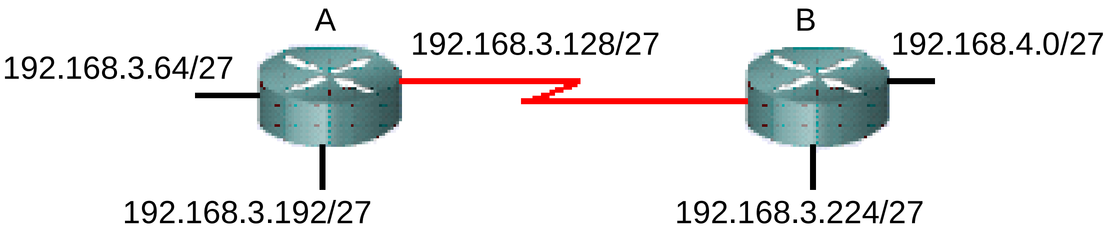
- No. VLSM has been used and the scheme is all right.
- Yes. A router should have all the subnets with the same subnet mask.
- Yes. 192.168.1.160 is not a valid subnet address.
- Yes. There is an overlap between 192.168.1.220/30 and 192.168.1.224/30
- ***Yes. There is an overlap between 192.168.1.220/30 and 192.168.1.192/27***
- Yes. There is an overlap between 192.168.1.160/27 and 192.168.1.192/27

How many host addresses are available on a subnet with the subnet mask 255.255.255.224?

- 2
- 6
- 14
- ***30***
- 62

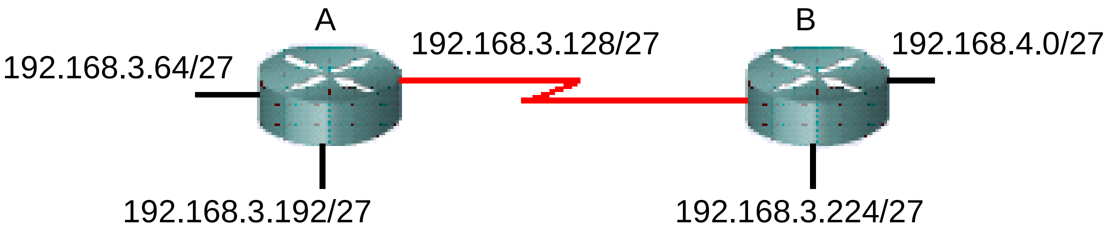
How many host addresses are available on a subnet with the subnet mask /28?

- 2
- 6
- ***14***
- 30
- 62



The routers are running RIPv1. Router B sends an update containing information about 192.168.3.224. What subnet mask will router A apply to this network?

- /16
- /23
- /24
- /25
- ***/27***



The routers are running RIPv1. Router B sends an update containing information about 192.168.4.0. What subnet mask will router A apply to this network?

- /16
- /23
- ***/24***
- /25
- /27

What address could be used to summarise all the class B private addresses?

- ***172.16.0.0/12***
- 172.16.0.0/14
- 172.16.0.0/16
- 172.16.0.0/18
- 172.16.0.0/20

A network has 50 hosts. What subnet mask would give a subnet with as few as possible unused addresses?

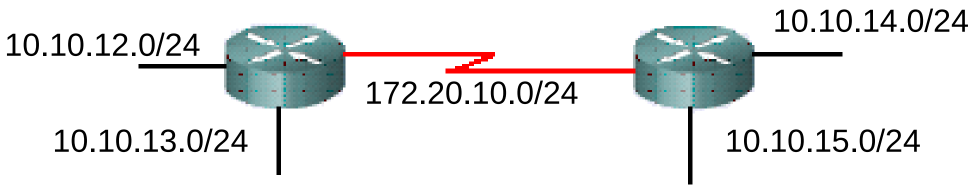
- 255.255.255.0
- 255.255.255.128
- ***255.255.255.192***
- 255.255.255.224
- 255.255.255.240
- 255.255.255.248

Which is an advantage of CIDR?

- Allows administrators to use classful routing protocols.
- ***Allows routers to have smaller routing tables.***
- Allows administrators to create subnets.
- Allows hosts to share public IP addresses.

What measures have been taken to allow us to continue to use IP v4 in spite of the diminishing supply of addresses? (Choose 2)

- ***CIDR and VLSM were introduced.***
- ***Private addresses and NAT were introduced.***
- Longer addresses were introduced.
- Exterior routing protocols were introduced.

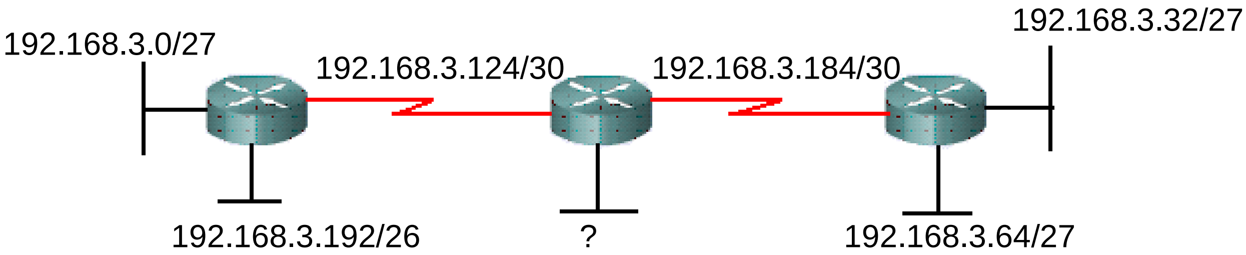


The diagram shows an example of:

- Use of VLSM
- Use of automatic summarisation
- ***Discontiguous subnets***
- Overlapping networks

A summary route in a routing table is given as 180.32.0.0/13. Which range of addresses will match this summary?

- 180.32.0.0 to 180.32.255.255
- 180.32.0.0 to 180.33.255.255
- 180.32.0.0 to 180.35.255.255
- ***180.32.0.0 to 180.39.255.255***
- 180.32.0.0 to 180.63.255.255



Which of the following would be suitable as the missing subnet address if 20 host addresses are required?

- 192.168.3.96/27
- ***192.168.3.128/27***
- 192.168.3.164/27
- 192.168.3.176/27
- 192.168.3.224/27

CCNA2 Chapter 7 Practice

Which is a difference between RIP version 1 and RIP version 2?

- The routing metric
- The routing algorithm
- ***Support for authentication***
- Support for hierarchical networks

Which of these is a characteristic of RIP v2 that makes it more suitable for modern networks than RIP v1?

- ***It is a classless routing protocol.***
- It is a classful routing protocol.
- Its metric can accommodate a larger network.
- It has a lower administrative distance.

Why is the use of a multicast address for RIP v2 routing updates an improvement over the use of a broadcast address?

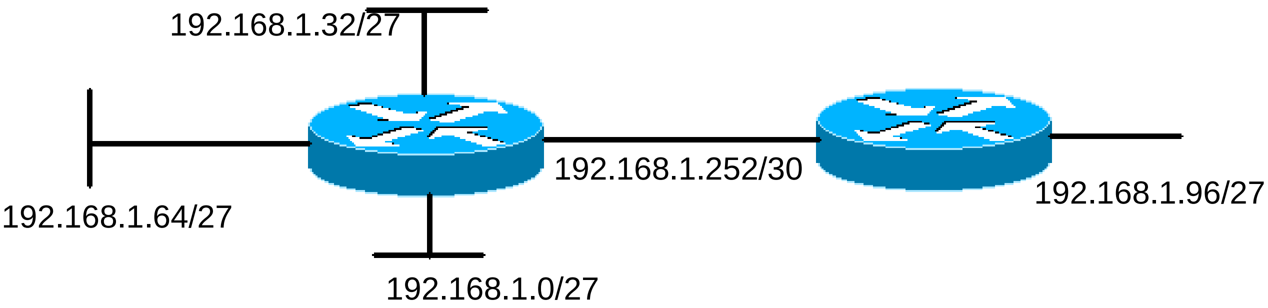
- Routers give priority to multicast addressed packets when they are received whereas broadcast receives low priority.
- It eases the pressure on the limited number of usable IP addresses.
- ***Hosts that are not running RIP will discard the packets at layer 2 instead of processing them as far as layer 4.***
- It enables the routers to learn about all other routers in the system that are running RIP v2.

What information is found in a RIP v2 update but not in a RIP v1 update? (Choose 2)

- Network address
- ***Subnet mask***
- Number of hops
- ***Next hop address***
- Default route

How do RIP v1 and RIP v2 compare in their features to avoid routing loops?

- RIP v1 uses the split horizon rule but RIP v2 does not need to use it.
- RIP v1 takes longer to count to infinity than RIP v2.
- RIP v2 has a higher default value for its holddown counter.
- RIP v2, being classless, is less prone to develop routing loops.
- ***Both versions use the same methods of avoiding routing loops.***

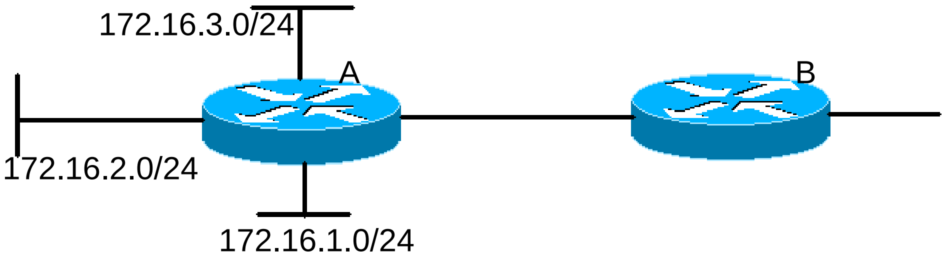


Why should RIP v2 be run on this network rather than RIP v1?

- The major network address has been subnetted.
- The subnets are discontiguous.
- ***VLSM has been used.***
- CIDR has been used.

Why should RIP v2 not be run with default settings on a network with discontiguous subnets?

- ***It summarises to class boundaries so that remote discontiguous networks are not recognised.***
- It does not send subnet mask information in its routing updates, so it cannot recognise subnets unless they are directly connected.
- It has a maximum hop count of 15 and this is not enough to reach discontiguous subnets.
- It does not support VLSM or CIDR so that it cannot carry out the summarising needed for discontiguous networks.



Routers A and B are running RIP v2 with default settings. What networks should A advertise to B?

- 172.16.1.0/24, 172.16.2.0/24 and 172.16.3.0/24
- 172.16.1.0/22
- ***172.16.0.0/16***
- 172.16.0.0/23 and 172.16.2.0/23

The 192.168.1.0 network has been subnetted using VLSM and all the subnets are contiguous. Router D is the border router leading to another group of networks, and it advertises 192.168.1.0/24 to Router E. All routers in the system are running RIP v2. A packet addressed to 192.168.1.2 arrives at Router E. What will happen?

- Router E will drop the packet because it does not have a route to the required subnet.
- ***Router E will send the packet on the summary route to Router D and Router D will then forward the packet on to the right subnet.***
- Router E will send the packet on its default route to Router D and Router D will then forward the packet on to the right subnet.
- Router E will send the packet to Router D but router D will drop the packet.

Router A has been configured to run RIP with default settings. It's immediate neighbour, Router B, has been configured to run RIP v2. What is true of the updates?

- The routers are running different versions of RIP and so neither router can read routing updates from the other router.
- Router A will send version 1 updates which can be read by Router B, but Router B will send version 2 updates which cannot be read by Router A.
- Router B will autodetect that Router A is running RIP v1 and will therefore send v1 updates to Router A.
- ***Router B will send v2 updates to Router A and Router A will read the updates, but ignore information that is specific to v2.***

Which are examples of supernetting? (Choose 2)

- 10.10.0.0/12
- 10.10.0.0/16
- 10.10.0.0/21
- ***172.19.0.0/12***
- 172.19.0.0/16
- 172.19.0.0/21
- 172.19.0.0/24
- ***192.168.0.0/21***
- 192.168.0.0/24

Which command would propagate a default route across a network where routers are running RIP v2?

- Default-route propagate
- ***Default-information originate***
- Redistribute rip
- Redistribute default-information

A router configuration includes the following:

```
Router(config)#int fa0/0
Router(config-if)#ip address 172.16.1.0 255.255.255.0
Router(config)#int fa0/1
Router(config-if)#ip address 172.16.2.0 255.255.255.0
Router(config)#int s0/0
Router(config-if)#ip address 172.16.3.0 255.255.255.0
```

The router is running RIP v1. Would it be sensible to configure serial 0/1 with the IP address 172.16.20.0 255.255.255.252?

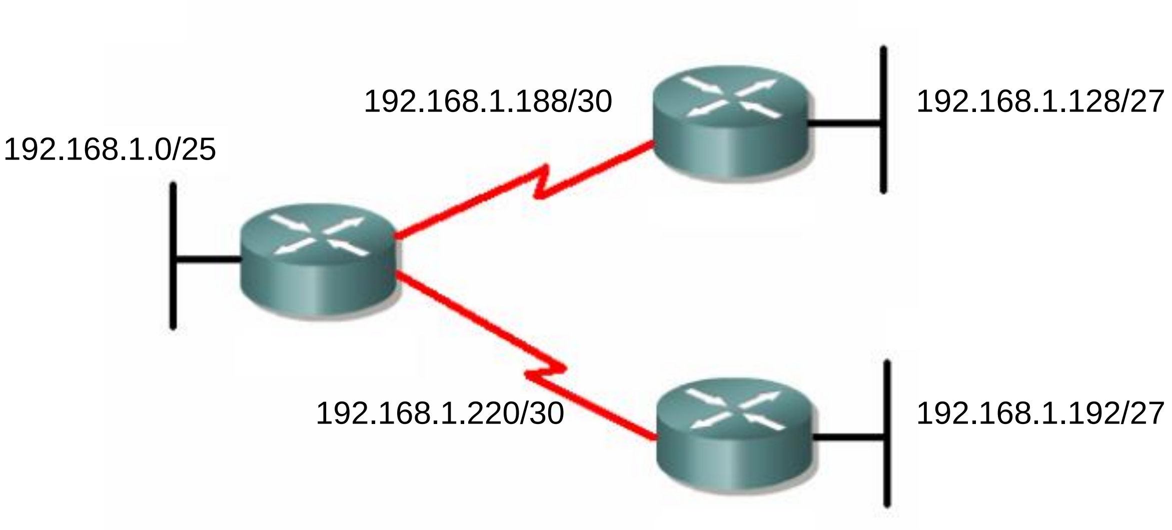
- No, because this is not a valid subnet mask for a serial interface.
- No, because this would create an overlap of IP addresses.
- No, because the 172.16.4.0 address should be used next for consistency.
- ***No, because this would involve VLSM which is not supported by RIP v1.***
- Yes, this would be acceptable because it is on a different classful network.

Router A has a summarised route to 172.16.0.0/14. It sends a RIP v2 update including this route to Router B, which is also running RIP v2. What happens?

- ***Router B installs the summarised route to 172.16.0.0/14 in its routing table (assuming that it has no better route.)***
- Router B performs automatic summarisation to the class boundary and installs a route to 172.16.0.0/16.
- Router B performs automatic summarisation to the class boundary and installs routes to 172.16.0.0/16, 172.16.1.0/16, 172.16.2.0/16 and 172.16.3.0/16.
- Router B does not install any route to 172.16.0.0 in its routing table.

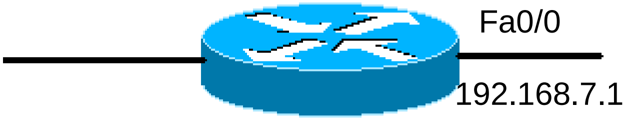
Router A has a summarised route to 172.16.0.0/14. It sends a RIP v2 update including this route to Router B, which is running RIP v1. What happens?

- Router B installs the summarised route to 172.16.0.0/14 in its routing table (assuming that it has no better route.)
- Router B performs automatic summarisation to the class boundary and installs a route to 172.16.0.0/16.
- Router B performs automatic summarisation to the class boundary and installs routes to 172.16.0.0/16, 172.16.1.0/16, 172.16.2.0/16 and 172.16.3.0/16.
- ***Router B does not install any route to 172.16.0.0 in its routing table.***



Why is there a problem with the addressing scheme above?

- ***There is an overlap between 192.168.1.220/30 and 192.168.1.192/27***
- There is an overlap between 192.168.1.188/30 and 192.168.1.192/27
- There is an overlap between 192.168.1.128/27 and 192.168.1.188/30
- 192.168.1.188 is not a valid network address.
- 192.168.1.220 is not a valid network address.



You want the 192.168.7.0 network to be advertised in routing updates, but you do not want routing updates to be sent out of interface 192.168.7.1. Which commands should you give? (Choose 2)

- ***Router(config)#router rip***
  Router(config-router)#network 192.168.7.0
- Router(config)#router rip
  Router(config-router)#no network 192.168.7.0
- Router(config)#router rip
  Router(config-router)#192.168.7.1 inactive
- Router(config)#int fa0/0
  Router(config-router)#shutdown
- ***Router(config)#router rip***
  Router(config-router)#passive-interface 192.168.7.1

CCNA2 Chapter 8 Practice

C   192.168.3.0/24 is directly connected, Serial0/1
Which are true of this route? (Choose 3)

- ***This is an ultimate route.***
- This is not an ultimate route.
- ***This is a level 1 route.***
- This is a level 2 route.
- ***This is a network route.***
- This is a supernet route.
- This is a parent route.
- This is a child route.

R   192.168.4.0/24 [120/2] via 172.30.1.1, 00:00:02, Serial0/0
Which are true of this route? (Choose 3)

- ***This is an ultimate route.***
- This is not an ultimate route.
- ***This is a level 1 route.***
- This is a level 2 route.
- ***This is a network route.***
- This is a supernet route.
- This is a parent route.
- This is a child route.

172.30.0.0/24 is subnetted, 3 subnets
C   172.30.1.0 is directly connected, Serial0/0
C   172.30.2.0 is directly connected, Serial0/1
R   172.30.3.0 [120/1] via 172.30.2.2, 00:00:12, Serial0/1
Which are true of the route to 172.30.3.0? (Choose 3)

- ***This is an ultimate route.***
- This is not an ultimate route.
- This is a level 1 route.
- ***This is a level 2 route.***
- This is a network route.
- This is a supernet route.
- This is a parent route.
- ***This is a child route.***

172.30.0.0/24 is subnetted, 3 subnets
C   172.30.1.0 is directly connected, Serial0/0
C   172.30.2.0 is directly connected, Serial0/1
R   172.30.3.0 [120/1] via 172.30.2.2, 00:00:12, Serial0/1
Which are true of the route to 172.30.0.0? (Choose 3)

- This is an ultimate route.
- ***This is not an ultimate route.***
- ***This is a level 1 route.***
- This is a level 2 route.
- This is a supernet route.
- ***This is a parent route.***
- This is a child route.

```
172.30.0.0/24 is subnetted, 3 subnets
C   172.30.1.0 is directly connected, Serial0/0
C   172.30.2.0 is directly connected, Serial0/1
R   172.30.3.0 [120/1] via 172.30.2.2, 00:00:12, Serial0/1
S    172.30.4.0 [1/0] via 172.30.1.2
```

Which address will require a recursive lookup?

- 172.30.1.24
- 172.30.2.24
- 172.30.3.24
- ***172.30.4.24***

A router has three directly connected networks, 192.168.9.0/26, 192.168.9.64/26 and 192.168.9.128/26. What parent route will be included in the routing table?

- ***192.168.9.0/24***
- 192.168.9.0/26
- 192.168.9.0/28
- 192.168.0.0/16

```
172.30.0.0/24 is subnetted, 3 subnets
C   172.30.1.0 is directly connected, Serial0/0
C   172.30.2.0 is directly connected, Serial0/1
R   172.30.3.0 [120/1] via 172.30.2.2, 00:00:12, Serial0/1
S    172.30.4.0 [1/0] via 172.30.1.2
C    172.30.5.0 is directly connected, FastEthernet 0/0
S*   0.0.0.0/0 is directly connected, Serial 0/0
```

The router with this routing table is running an IOS with a version before 11.3 and the default routing behaviour has not been changed. What will happen to a packet addressed to 172.30.3.6?

- It will be forwarded through Serial 0/0
- ***It will be forwarded through Serial 0/1***
- It will be forwarded through FastEthernet 0/0
- It will be dropped

```
172.30.0.0/24 is subnetted, 3 subnets
C   172.30.1.0 is directly connected, Serial0/0
C   172.30.2.0 is directly connected, Serial0/1
```

R   172.30.3.0 [120/1] via 172.30.2.2, 00:00:12, Serial0/1
S   172.30.4.0 [1/0] via 172.30.1.2
C   172.30.5.0 is directly connected, FastEthernet 0/0
S*   0.0.0.0/0 is directly connected, Serial 0/0

The router with this routing table is running an IOS with a version before 11.3 and the default routing behaviour has not been changed. What will happen to a packet addressed to 172.30.6.6?

- It will be forwarded through Serial 0/0
- It will be forwarded through Serial 0/1
- It will be forwarded through FastEthernet 0/0
- ***It will be dropped***

172.30.0.0/24 is subnetted, 3 subnets
C   172.30.1.0 is directly connected, Serial0/0
C   172.30.2.0 is directly connected, Serial0/1
R   172.30.3.0 [120/1] via 172.30.2.2, 00:00:12, Serial0/1
S   172.30.4.0 [1/0] via 172.30.1.2
C   172.30.5.0 is directly connected, FastEthernet 0/0
S*   0.0.0.0/0 is directly connected, Serial 0/0

The router with this routing table is running an IOS with a version before 11.3 and the default routing behaviour has not been changed. What will happen to a packet addressed to 172.31.3.6?

- ***It will be forwarded through Serial 0/0***
- It will be forwarded through Serial 0/1
- It will be forwarded through FastEthernet 0/0
- It will be dropped

A router running IOS version 11.2 has a default route but it is dropping packets addressed to hosts on the subnet 192.168.1.64/28, which is not in its routing table. Subnet 192.168.1.32/28 is in its routing table. What can an administrator do so that these packets use the default route?

- Switch to a classless routing protocol
- ***Give the command ip classless***
- Give the command **no ip classless**
- Configure the default route again

Gateway of last resort is not set

```
192.168.1.0/24 is variably subnetted, 4 subnets, 2 masks
C   192.168.1.0/27 is directly connected, FastEthernet0/0
C   192.168.1.96/27 is directly connected, FastEthernet0/1
R   192.168.1.160/27 [120/1] via 192.168.1.193, 00:00:12, Serial0/0
C   192.168.1.192/30 is directly connected, Serial 0/0
```

What will happen to a packet addressed to 192.168.1.120?

- It will be forwarded through FastEthernet0/0
- ***It will be forwarded through FastEthernet0/1***
- It will be forwarded through Serial0/0
- It will be dropped

```
Gateway of last resort is not set

192.168.1.0/24 is variably subnetted, 4 subnets, 2 masks
C   192.168.1.0/27 is directly connected, FastEthernet0/0
C   192.168.1.96/27 is directly connected, FastEthernet0/1
R   192.168.1.160/27 [120/1] via 192.168.1.193, 00:00:12, Serial0/0
C   192.168.1.192/30 is directly connected, Serial 0/0
```

What will happen to a packet addressed to 192.168.1.38?

- It will be forwarded through FastEthernet0/0
- It will be forwarded through FastEthernet0/1
- It will be forwarded through Serial0/0
- ***It will be dropped***

Which route would provide the best match for a packet addressed to 172.16.0.12?

- 172.16.0.0/16
- 172.16.0.0/20
- 172.16.0.0/24
- ***172.16.0.0/28***
- 172.16.0.0/30

A router has a static route to 172.16.0.0/16 and a RIPv2 route to 172.16.1.0/24. Which route will be used by a packet addressed to 172.16.1.6?

- The static route because it has a lower administrative distance
- ***The RIPv2 route because it is a better match***
- Load balancing will be used so it might go on either route
- The packet will be dropped

CCNA2 Chapter 10 Practice

Which are the first networks to be put in the routing table?

- ***Directly connected networks.***
- Networks learned using OSPF
- Networks learned using EIGRP.
- Networks learned using RIP.

What needs to be true of a link before that link is included in link state updates? (Choose all that apply.)

- ***The link must have an IP address configured.***
- ***The link must be up.***
- The link must be a serial link.
- ***The link must have its network included in a network command.***

Which routing algorithm is used by link state routing protocols?

- DUAL
- ***SPF***
- LSU
- Bellman-Ford

When does a link state routing protocol make most use of bandwidth? (Choose 2)

- It uses a similar amount all the time.
- Every 30 seconds.
- ***When the routers first start up.***
- ***When the topology changes.***

Where does a link state router send link state packets?

- To all directly connected devices.
- To all routers in the area that are running the same routing protocol.
- To one central router in the area.
- ***To all neighbours with which it has become adjacent.***

When does a link state router send hello packets?

- When there is a topology change.
- ***At regular intervals to maintain a keepalive.***
- When a neighbour sends a request.
- To notify that a regular update is due.

Which will be the same for all routers in an OSPF area that has converged?

- The routing table
- ***The link state database***
- The neighbour table
- The best paths to each destination.

What information is included in a link state packet? (Choose all that apply)

- ***Address and mask of network for the link***
- ***Metric for the link***
- Address of final destination network
- Number of hops to destination
- ***Hostname of neighbour on the link***
- ***Type of link e.g. Serial, Ethernet***

Why is it an advantage for a link state protocol to have a hierarchical design?

- It allows routers made by different manufacturers to be used.
- ***It cuts down processing time and use of bandwidth.***
- It allows all routers to become adjacent to each other.
- It allows a more efficient metric to be used.

Which is true of a link state routing protocol?

- Each router should have the same information in its routing table when the network has converged.
- Each router uses the best route metric supplied by its neighbour to calculate backup routes.
- ***Each router calculates its own best routes using the information in its link state database.***
- Each router passes on its best route calculations to its neighbour to save on processing effort.

How does a link state routing protocol differ from EIGRP?

- It uses hello packets to form adjacencies with neighbours.
- It sends updates when the topology changes.
- It is fast to converge.
- ***It holds information about the whole topology of the routing area.***

How do link state protocols manage to avoid routing loops?

- They use the split horizon rule so that they do not send information out of an interface that has received it.
- ***They hold a complete picture of the topology so that the routing algorithm should not produce any routes containing loops.***
- They use holddown timers so that they wait before passing on the information that a link may be down.
- They use count to infinity by restricting the number of hops to a network.

Which are advantages of using a link state routing protocol rather than a distance vector routing protocol such as RIP? (Choose 2)

- ***Link state routing protocols give fast convergence.***
- Link state routing protocols make lower demands on router processing power.
- Link state routing protocols send regular complete updates so that the information is always correct.
- ***Link state routing protocols tend to use less bandwidth after the initial flooding phase.***

What is the Dijkstra algorithm?

- Another name for the Bellman-Ford algorithm.
- Another name for the DUAL algorithm.
- ***Another name for the SPF algorithm.***
- Another name for the STP algorithm.

Which is true of OSPF’s metric in the Cisco implementation?

- ***The metric is cost, which is calculated so that the highest bandwidth links have the lowest cost.***
- The metric is cost, which is calculated using the number of hops.
- The metric is cost, which is calculated according to the charge that the ISP makes for the link.
- The metric is cost, which is calculated using bandwidth and delay by default, though load and reliability can also be used.

When a link goes down, how long does a router running a link state protocol wait before sending an update to its neighbours?

- 30 seconds
- 90 seconds
- 30 minutes
- ***It sends the update at once.***

What does a link state router do to a link state packet after receiving it and before forwarding it to a neighbour?

- It updates the metric by 1.
- It recalculates the best routes and updates the packet.
- ***Nothing. It forwards the packet as it is.***
- It does not forward packets that it receives.

Where would OSPF be a good choice of routing protocol but EIGRP would not?

- On a network where the routers are old and have little processing power.
- ***On a network where non-Cisco routers may be used.***
- On a network where subnetting uses VLSM.
- On a network where fast convergence is essential.

CCNA2 Chapter 11 Practice

Two neighbouring routers are configured for OSPF, but they have different hello and dead intervals. What will happen?

- They will become adjacent as long as they are configured for the same area.
- They will negotiate a hello interval before they become adjacent.
- They will become adjacent as long as they are configured with the same process number.
- ***They will fail to become adjacent.***

Router A is configured for OSPF using the following commands:

```
RouterA(config)#router ospf 1
RouterA(config-router)#network 192.168.1.0 0.0.0.255 area 0
RouterA(config-router)#network 192.168.2.0 0.0.0.255 area 0
```

Neighbouring router B is to be configured for OSPF. What must be true if the routers are to become adjacent?

- The routers must be linked by their serial interfaces.
- Router B must use the process number 1 in its configuration.
- ***Router B must use area 0 in its configuration.***
- Both the routers must be Cisco routers.

What is the default administrative distance for OSPF?

- 90
- 100
- ***110***
- 120

If a Cisco router learns two routes to the same destination, one through OSPF and one through EIGRP, which route will be added to the routing table if default values are used?

- The OSPF route
- ***The EIGRP route***
- It will depend on the metrics for the routes
- Both routes will be added
- Neither route will be added.

What routing metric is defined by the OSPF standard?

- ***Cost***
- Bandwidth
- Hop count
- Bandwidth and delay

What parameters do Cisco routers use in order to calculate the OSPF metric?

- Hop count, with a maximum of 100 hops.
- ***Bandwidth, related to a standard bandwidth.***
- Cost charged by the service provider for use of the link.
- A combination of bandwidth and delay, with the option of using load and reliability as well.

Why would you use the bandwidth command when configuring an interface, where OSPF routing is used?

- To control the speed of the link and maximise efficiency.
- To make sure that both ends of the link are operating at the same bandwidth.
- ***To ensure that OSPF uses a suitable value when calculating its metric.***
- To ensure that the two routers are using the same parameters and can become adjacent.

Which interface configuration command might you use as an alternative to using the bandwidth command, and achieve the same goal.

- ***Cost***
- Charge
- Clock rate
- Description
- Link speed

A routing table contains the entry:
O   192.168.3.0/24 [110/1786] via 192.168.1.0, 00:00:20, Serial0/0
What are the numbers in brackets?

- Administrative distance and bandwidth.
- Administrative distance and hop count
- ***Administrative distance and cost***
- Autonomous system and bandwidth.
- Autonomous system and hop count
- Autonomous system and cost

What happens to a routing table if the router loses power?

- ***It is lost because it is held only in RAM.***
- If it has been saved to NVRAM then it can be recovered, otherwise it is lost.
- It is held in flash memory, so it can be recovered on re-boot.
- It is lost unless the router has been configured to make automatic back-ups to a TFTP server.

Which routes will appear first in a routing table when a router is started up and loads an existing configuration? (Choose 2)

- ***Static routes that are in the configuration.***
- OSPF routes if the configuration includes OSPF.
- EIGRP routes if the configuration includes EIGRP.
- RIP routes if the configuration includes RIP
- ***Directly connected routes if the interfaces are configured and come up.***

A router is configured for OSPF and given the command:
Router(config-router)#**network 172.16.3.0 0.0.0.255 area 0**
What is the 0.0.0.255 item?

- The subnet mask
- The inverse mask
- ***The wildcard mask***
- The area mask

A router is configured for OSPF and given the command:
Router(config-router)#**network 192.168.3.0 255.255.255.240 area 0**
If the router accepts this command, what will appear in the running configuration?

- network 192.168.3.0 255.255.255.240 area 0
- network 192.168.3.0 255.255.255.15 area 0
- network 192.168.3.0 0.0.0.240 area 0
- network 192.168.3.0 0.0.0.42 area 0
- ***network 192.168.3.0 0.0.0.15 area 0***

Which is true?

- The network command must contain a mask for both OSPF and EIGRP.
- ***The network command must contain a mask for OSPF but it is optional for EIGRP.***
- The network command must contain a mask for EIGRP but it is optional for OSPF.
- The network command can contain an optional mask for both OSPF and EIGRP.

What does OSPF do about automatic summarisation?

- By default it will summarise to the classful boundary when sending updates.
- You need to use the **no autosummary** command if there are discontiguous subnets.
- It will use automatic summarisation if you leave the mask out of the network statements.
- ***OSPF does not carry out automatic summarisation to classful boundaries.***

The 172.16.0.0 network is subnetted using a /20 mask. Which network statement is correct for this mask?

- Network 172.16.16.0 0.0.0.15 area 0
- Network 172.16.16.0 0.0.0.240 area 0
- Network 172.16.16.0 0.0.3.255 area 0
- Network 172.16.16.0 0.0.7.255 area 0
- ***Network 172.16.16.0 0.0.15.255 area 0***
- Network 172.16.16.0 0.0.224.255 area 0
- Network 172.16.16.0 0.0.240.255 area 0

The 172.16.0.0 network is subnetted using a /26 mask. Which network statement is correct for this mask?

- Network 172.16.16.0 0.0.0.3 area 0
- Network 172.16.16.0 0.0.0.7 area 0
- Network 172.16.16.0 0.0.0.15 area 0
- Network 172.16.16.0 0.0.0.31 area 0
- ***Network 172.16.16.0 0.0.0.63 area 0***
- Network 172.16.16.0 0.0.0.127 area 0
- Network 172.16.16.0 0.0.0.255 area 0

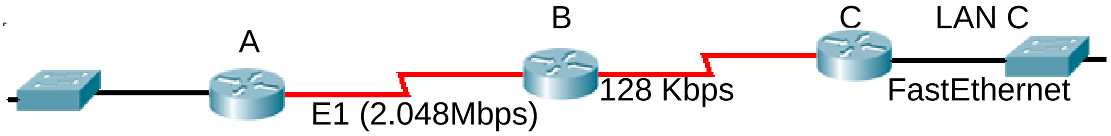
By default, cost is calculated as 10^8/bandwidth.

What is the cost of a 10Mbps Ethernet link?

- 1
- ***10***
- 100
- 1000

By default, cost is calculated as 10^8/bandwidth. A serial link is configured with the command **bandwidth 56**. What is the cost of the link?

- 48
- 56
- 64
- 781
- 1652
- ***1785***

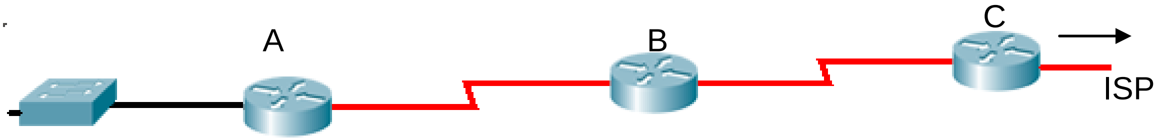


By default, cost is calculated as 10^8/bandwidth. What cost would router A calculate to a destination on LAN C?

- 49
- 128
- 781
- ***831***

What does the arrival of a hello packet from an OSPF neighbour do to the dead timer associated with that neighbour?

- Sets it to zero.
- ***Sets it to the default or configured value.***
- Sets it to the value of the hello timer.
- Nothing.



Router C has been configured with a default route to the ISP. Routers A, B and C are using OSPF. How can routers A and B learn the default route from C?

- Include the default route in a network command on A and B.
- ***Include the default information originate command in router C's configuration.***
- Include the **default information originate** command in router A's configuration.
- Include the **redistribute ospf** command in router C's configuration.
- Include the **redistribute ospf** command in router A's configuration.

Refer to the previous question. Hosts on networks connected to routers A, B and C can send messages to the ISP. What should be done so that the ISP can send replies back to the hosts?

- Configure a default route to C on the ISP's router.
- Configure OSPF on all routers on the path to each destination.
- Configure a static route to C on the ISP's router.
- ***Configure a static route or static routes on the ISP's router to include all networks connected to A, B and C.***

If router A uses OSPF and learns a default route that has been configured on router C, how is this default route likely to be displayed in A's routing table?

- S* 0.0.0.0/0 [0/0] is directly connected, Serial0/1
- O 0.0.0.0/0 [110/847] via 192.168.1.1, 00:00:20, Serial0/1
- O* 0.0.0.0/0 [110/847] via 192.168.1.1, 00:00:20, Serial0/1
- O*E1 0.0.0.0/0 [110/1] via 192.168.1.1, 00:00:20, Serial0/1
- ***O*E2 0.0.0.0/0 [110/1] via 192.168.1.1, 00:00:20, Serial0/1***

A router has directly connected networks 172.16.4.0/23 and 172.16.6.0/23. What single network command would allow OSPF routing updates to include both of these networks?

- Network 172.16.4.0 0.0.0.255 area 0
- Network 172.16.4.0 0.0.1.255 area 0
- ***Network 172.16.4.0 0.0.3.255 area 0***
- Network 172.16.4.0 0.0.7.255 area 0
- Network 172.16.4.0 0.0.15.255 area 0

At which prompt would you give the router-id command if you wish to set up a router ID for OSPF purposes?

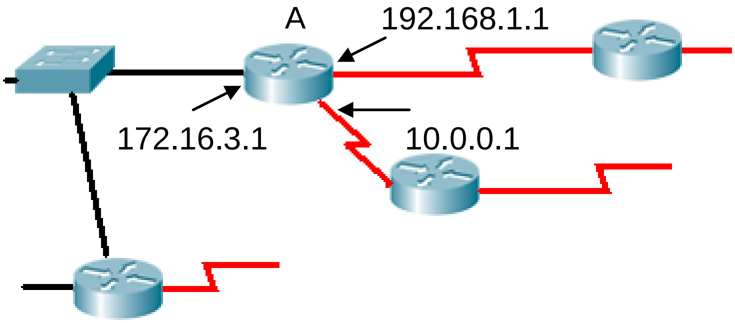
- Router(config)#
- Router(config-if)#
- ***Router(config-router)#***
- Router(config-line)#
- Router(config-id)#

A router has active interfaces 192.168.1.1, 172.16.3.1, and 10.0.0.1. It has a loopback interface 172.31.255.255. It has been configured with the command **router-id 192.168.255.6**. What ID will the router use?

- 192.168.1.1
- ***192.168.255.6***
- 172.16.3.1
- 172.31.255.255
- 10.0.0.1

A router has active interfaces 192.168.1.1, 172.16.3.1, and 10.0.0.1. It has a loopback interface 172.31.255.255. It has not been configured with the router-id command. What ID will the router use?

- 192.168.1.1
- 172.16.3.1
- ***172.31.255.255***
- 10.0.0.1



Router A has three active interfaces with IP addresses as shown. It has no loopback interfaces and no router-id configured. What router ID will it use when it takes part in a DR/BDR election?

- ***192.168.1.1***
- 172.16.3.1
- 10.0.0.1
- It will not have a router ID
- It will not need to take part in an election

Which type(s) of network(s) require(s) a DR/BDR election for OSPF?

- Non-broadcast multi-access networks
- Broadcast multi-access networks
- Point to point networks
- ***All multi-access networks***
- All serial links

An Ethernet network has only one router connected to it. Will there be a DR/BDR election on this network?

- No, the single router will automatically be the DR.
- ***No, the OSPF process will not reach the election stage.***
- No, an Ethernet network does not hold DR/BDR elections.
- Yes, an Ethernet network must always hold an election.

A multipoint Frame Relay network has 5 routers. How many OSPF adjacencies would be needed if the DR/BDR system did not exist?

- 5
- 6
- 8
- ***10***
- 12
- 20

A multipoint Frame Relay network has 5 routers. How many OSPF full adjacencies are formed after the DR/BDR elections?

- 5
- 6
- ***7***
- 8
- 9
- 10

How can you configure your most powerful router so that it should win a DR/BDR election even if it does not have the highest router ID?

- Give it a loopback address.
- ***Give it a higher priority than the other routers.***
- Give it a lower priority than the other routers.
- The most powerful router will automatically win so there is no need to do anything.

You have configured a router to be chosen as DR, however another router is chosen when the routers are powered on. What could be the problem?

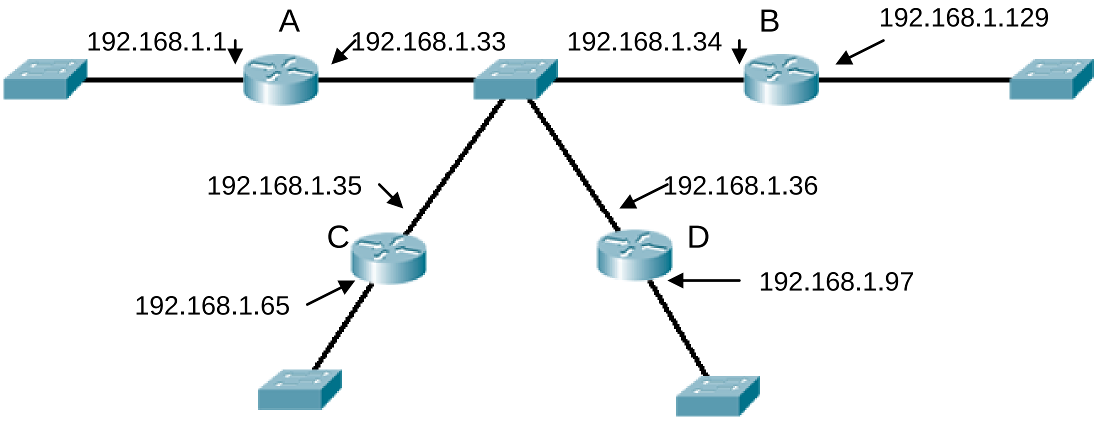
- ***Your preferred router took longer to load, and a DR had already been chosen.***
- Your preferred router has a higher router ID than the other routers.
- Your preferred router has a higher priority than the other routers.
- The other router is more powerful.
- The other router provides the entry to the stub network.

What sort of router is referred to as DROther?

- A designated router
- A backup designated router
- ***A router that has not been chosen as DR or BDR***
- A router that will become DR if the existing DR goes down.

Routers pass through the 2-WAY state as they move towards full adjacency. In what circumstances would routers remain in the 2-WAY state in relation to each other and not proceed to full adjacency?

- When they have not exchanged any hello messages.
- When they are configured with network commands that show different areas.
- ***When they are both DROther routers.***
- When one of them is a BDR router.



None of the routers has a router ID configured, none of them have loopback interfaces, and they all have the default priority. Which will be DR on the central network, assuming that none of them miss the start of the election.

- A
- ***B***
- C
- D

What happens on a multi-access network with 4 routers if the designated router goes down?

- There is a new election for DR and BDR.
- There is a new election for DR but the BDR is unchanged.
- ***The BDR becomes the new DR and a new BDR is elected.***
- The BDR becomes the new DR but there is no BDR.

The designated router on the 4-router network has gone down, and another router has taken over as DR. After a while, the original DR starts up again. What happens?

- ***The current DR and BDR keep their jobs and the original DR becomes a DROther.***
- A new election is held.
- The original DR gets its job back.
- The original DR becomes BDR.